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PROTECTION OF THE WATERS OF THE GREAT LAKES

INTERIM REPORT TO THE GOVERNMENTS
OF CANADA AND THE UNITED STATES

AUGUST 10, 1999



International
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Commission

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International Joint Commission
1250, 23rd Street NW - Suite 100
Washington, D.C. 20440



International Joint Commission
100, Metcalfe Street - 18th floor
Ottawa, Ontario K1P 5M1

August 10, 1999

The Honorable Madeleine Albright
Secretary of State
United States Department of State
Washington, D.C.

The Honourable Lloyd Axworthy
Minister of Foreign Affairs
Department of Foreign Affairs
Ottawa, Ontario

Dear Mr. Axworthy and Ms Albright:

We have the honour to transmit herewith the Interim Report of the International Joint Commission requested by the Governments of Canada and the United States in the Reference of February 10, 1999. As requested, the Commission plans to submit its final report by February 10, 2000.

The Commission plans to release the report to the public on August 18, 1999.

We invite the governments' comments on the report and its recommendations, in particular.

Yours sincerely,

Gerald E. Galloway
Secretary
United States Section

Murray Clamen
Secretary
Canadian Section



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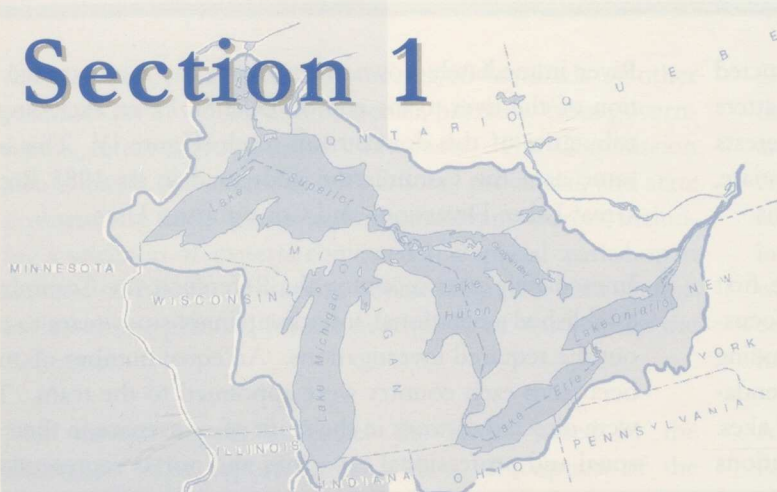
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Section 1



Introduction

Water is an important and often emotional issue throughout North America. Along the U.S.–Canadian border there have been many controversial issues involving boundary and transboundary water resources, and there also have been many opportunities for cooperative ventures, projects, and other efforts to make life considerably better for the citizens of both countries. The history of U.S.–Canadian relations is filled with examples of cooperative efforts in navigation, hydropower, agriculture, and fisheries and of significant improvements in water quality.

Diverting water from the Great Lakes has been an issue of interest and at times controversy between the United States and Canada. This issue, dating back to the last century, has been investigated by the International Joint Commission most recently in the mid-1980s¹. In 1996, the Commission advised both national governments that the issues of diversion and consumptive use of Great Lakes waters needed to be addressed more comprehensively than they had been to date.

In the light of recent proposals to export water from the Great Lakes and other areas of the United States and Canada, the governments decided to refer the issue of water use along the border to the International Joint Commission. In a letter of February 10, 1999 (the "Reference"; see Appendix 1), the governments —after noting that the number of proposals to use, divert, and remove greater amounts of water that flow along or across the boundary is increasing— stated that they were concerned that current management principles and conservation measures may be inadequate to ensure the future sustainable use of shared waters. Within this context, the governments requested the Commission to examine, report upon, and provide recommendations on the following matters that may affect levels and flows of waters within the boundary or transboundary basins and shared aquifers:

- existing and potential consumptive uses of water,
- existing and potential diversions of water in and out of the transboundary basins, including withdrawals of water for export,
- the cumulative effects of existing and potential diversions and removals of water, including removals in bulk for export,
- the current laws and policies as may affect the sustainability of the water resources in boundary and transboundary basins.

1. In 1985 the International Joint Commission submitted a report, *Great Lakes Diversions and Consumptive Uses*, to the governments.

In preparing its recommendations, the Reference instructed the Commission to consider in general terms such matters as potential effects on the environment and other interests of diversions and consumptive uses and, where appropriate, the implications of climatological trends and conditions.

The governments requested the Commission to give first priority to an examination of the Great Lakes Basin, focusing on the potential effects of bulk water removal, including removals for export, and to provide interim recommendations for the protection of the waters of the Great Lakes. The governments asked that the interim recommendations

River immediately downstream from the international section of the river to the end of Lake St. Peter, excluding the tributaries of this downstream reach (Figure 1)². This is the same area the Commission addressed in its 1985 Report, Great Lakes Diversions and Consumptive Uses.

Immediately after receiving the Reference, the Commission established a binational, interdisciplinary study team to carry out the required investigations. An equal number of members from each country were appointed to the team. They were directed to work in the spirit of consensus in their personal and professional capacities and not as representatives

Figure 1: The Great Lakes Basin.



covering the Great Lakes be submitted within six months and that a final report be submitted six months later. The Commission was asked to include in its final report advice on additional work that may be required to better understand the implications of consumption, diversion, and removal of water from boundary and transboundary basins and from shared aquifers elsewhere along the boundary.

In this interim report, "Great Lakes Basin" refers to the Great Lakes, their connecting channels, and the international section of the St. Lawrence River, together with their tributaries, and it also includes the reach of the St. Lawrence

of their countries or organizations. Members of the study team and advisers are listed in Appendix 2.

The Commission has carried out a broad public-consultation process and has made information related to work on this Reference as widely available as practicable. A section on the International Joint Commission web site (www.ijc.org) was created to disseminate information and to encourage public discussion during the study period. Eight public hearings were held throughout the Great Lakes Basin in both countries in the latter half of March 1999 (Appendix 3). In addition to the 160 presentations made at

2. This area goes beyond the boundary waters of the Great Lakes as defined in the Boundary Waters Treaty of 1909.

these hearings, the Commission received hundreds of other submissions in writing and by e-mail, primarily from governments, interest groups, and individuals. The Commission also initiated consultations with federal, provincial, and state governments and regional and other relevant sources, including a selection of experts convened at a special workshop at the end of March. Extensive additional public-consultation initiatives are planned for the next phase of work under the Reference.

This interim report addresses the issues raised by the Reference. The report begins with a description of the

Great Lakes system, the past and present water uses, and uses that can be expected in the future. It then addresses the cumulative effects of these uses and the issues of climate change, groundwater, and conservation. From there, the report moves to legal and policy considerations, followed by interim conclusions and recommendations. The report ends with a brief description of how the Commission will proceed to address the balance of the Reference and formulate its final recommendations.

A glossary of terms used in this report is provided in Appendix 4.

Section 2

The Great Lakes System



The Great Lakes Basin lies within eight states and two provinces and comprises the lakes, connecting channels, tributaries, and groundwater that drain through the international section of the St. Lawrence River. The waters of the Great Lakes Basin are a critical part of the natural and cultural heritage of the region, of Canada and the United States, and of the global community. More than 33 million people live in the Basin³. Spanning over 1,200 km (750 mi.) from east to west, these freshwater seas have made a vital contribution to the historical settlement, economic prosperity, culture, and quality of life and to the diverse ecosystems of the Basin and surrounding region.

The waters of the Great Lakes have been a fundamental factor in placing the region among the world's leading locations in which to live and do business. Water contributes to the health and well-being of all Basin residents, from its use in the home to uses in manufacturing and industrial activity, in shipping and navigation, in tourism and recreation, in energy production, and in agriculture. The Great Lakes are, however, more than just a resource to be consumed; they are also home to a great diversity of plants, animals, and other biota.

The waters of the Great Lakes are, for the most part, a nonrenewable resource. They are composed of numerous aquifers (groundwater) that have filled with water over the centuries, waters that flow in the tributaries of the Great Lakes, and waters that fill the lakes themselves. Although the total volume in the lakes is vast, on average less than 1 percent of the waters of the Great Lakes is renewed annually by precipitation, surface water runoff, and inflow from groundwater sources.

Lake levels are determined by the combined influence of precipitation (the primary source of natural water supply to the Great Lakes), upstream inflows, groundwater, surface water runoff, evaporation, diversions into and out of the system, and water level regulation. Because of the vast water surface area, water levels of the Great Lakes, even with large variations in precipitation and runoff, remain remarkably steady, with a normal fluctuation ranging from 30 to 60 cm (12–24 in.) in a single year.

Climatic conditions control precipitation (and thus groundwater recharge), runoff, and direct supply to the lakes as well as the rate of evaporation. These are the primary driving factors in determining water levels. With removals and in-basin consumptive use remaining relatively constant, during dry, hot weather periods, inflow is decreased and

3. For statistical purposes, Chicago is not included in the Basin.

evaporation increased, resulting in lower lake levels and reduced flows. During wet, colder periods, the opposite situation develops: higher levels and increased flows. Between 1918 and 1998, there were several periods of extremely high and extremely low water levels and flows. Exceptionally low levels were experienced in the mid-1920s, mid-1930s, and early 1960s. High levels occurred in 1929–30, 1952, 1973–74, 1985–86, and 1997–98. Studies of water level fluctuations have shown that the Great Lakes can respond relatively quickly to periods of above-average, below-average, or extreme precipitation, water supply, and temperature conditions. The effects of existing control structures, diversions, and dredging on levels are minor in comparison.

Great Lakes levels and lake level interests are highly sensitive to climatic variability, as illustrated by the impact of high water levels in the early 1950s and mid-1980s and of low water levels in the 1930s and mid-1960s. Significant variability will continue whether or not human-induced climate change is superimposed on natural fluctuations. An example of how quickly water levels can change in response to climatic conditions occurred during 1998–99, when the water levels of Lakes Michigan–Huron dropped 57 cm (22 in.) in 12 months.

Studies have concluded that the hydraulic characteristics of the Great Lakes system are the result of both natural fluctuation and, to a much lesser extent, human intervention. Control works that are operated under the authority of the International Joint Commission have been constructed in the St. Marys River at the outlet of Lake Superior and in the St. Lawrence River below the outflow from Lake Ontario. Connecting channels and canals have been dredged to facilitate deep-draft shipping, including dredging that has lowered Lakes Michigan–Huron by approximately 40 cm (15.8 in.). Moreover, the level of Lake Erie has been increased by obstructions in the Niagara River, including a number of fills on both sides of the river, with a cumulative effect of about 12 cm (4.8 in.).

Diversions have been constructed to bring water into the Great Lakes system from the Albany River system in northern Ontario at Longlac and Ogoki. They also have been constructed to take water out of the system at Chicago and, to a much lesser extent, through the Erie Canal. At the present time, more water is diverted into the system than is taken out. Water is also diverted around Niagara Falls for hydroelectric power generation, and water is diverted from Lake Erie to Lake Ontario through the Welland Canal.

Groundwater is important to the Great Lakes ecosystem because it provides a reservoir for storing water and for slowly replenishing the Great Lakes through base flow in the tributaries and through direct inflow to the lakes. Groundwater also serves as a source of water for many human communities and provides moisture and sustenance to plants and other biota.

Recent U.S. studies have estimated that groundwater makes a significant contribution to the overall water supply in the Great Lakes Basin, accounting for approximately 22 percent of the U.S. supply to Lake Erie, 33 percent of the supply to Lake Superior, 35 percent of the supply to Lake Michigan, and 42 percent of the supply to Lakes Huron and Ontario. Over most of Ontario, the contribution of groundwater to stream flow is less than 20 percent. This is because of the predominance of silt and clay or poorly fractured bedrock at the surface. However, in some portions of the Lake Erie and Lake Ontario basins, where sand and gravel are found at the surface, the contribution of groundwater to local streams can be as high as 60 percent or more.

The Great Lakes Basin is home to a diverse range of fish, mammals, birds, and other biota. Because of such things as pollution, agriculture, urban growth, deforestation, overfishing, the introduction of exotic species, and other human-related issues, the Basin ecosystem has lost a number of species and has lost extensive habitat. The overall impact of these changes is not well understood.

Section 3



Water Uses in the Great Lakes Basin

The Commission has conducted a preliminary examination of water use data in the Great Lakes Basin. Data currently available are dated (1987–93); however, the Commission expects that 1997 data will be available for its final report and cautions that the water use information in this interim report should be considered in that light. Water uses are presented in two categories: consumptive use and removals. Close to 90 percent of withdrawals are taken from the lakes themselves, with the remaining 10 percent coming from tributary streams and groundwater sources (Figure 2-A)⁴.

Consumptive Use

An estimated 5 percent of the water withdrawn from the Great Lakes is consumed and is therefore lost to the Basin. This figure comes from the Regional Water Use Data Base—a database that has been maintained by the Great Lakes Commission since 1988 on behalf of the states and provinces and is current to 1993. In 1993⁵, consumptive use in the Great Lakes Basin was estimated to be 116 cms (4,096 cfs) as compared to a withdrawal of about 2,493 cms (88,000 cfs) (Figure 2-B). The 1993 consumptive use in the Great Lakes Basin can be summarized as follows:

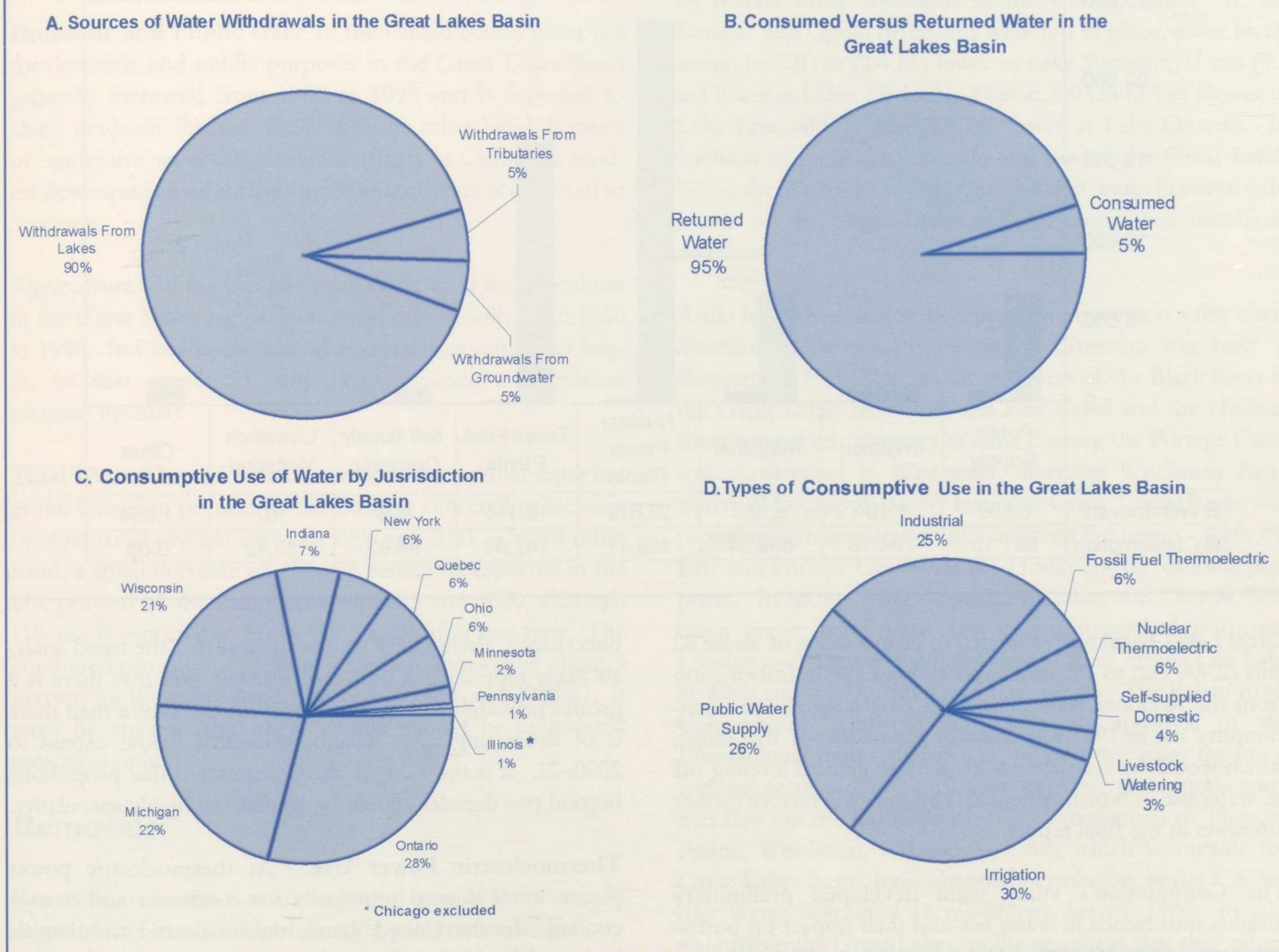
- By country: In total, consumptive use is 36 percent for Canada and 64 percent for the United States, with per capita consumptive use being approximately equal for the two countries.
- By jurisdiction: The largest user is Ontario at 29 percent followed by Michigan at 22 percent; Wisconsin at 21 percent; Indiana at 7 percent; New York, Quebec, and Ohio at 6 percent each; Minnesota at 2 percent; and Pennsylvania and Illinois at less than 1 percent each (Figure 2-C)⁶.
- By type of water use: The largest user is irrigation at 30 percent followed by public water supply at 26 percent, industrial use at 25 percent, fossil fuel thermoelectric and nuclear thermoelectric uses at 6 percent each, self-supplied domestic use at 4 percent, and livestock watering at 3 percent (Figure 2-D).

4. Because water withdrawn for use in hydroelectric facilities is immediately returned to its source, withdrawal figures used in this report do not include withdrawals for hydroelectric purposes.

5. The data are current to 1987 for Michigan and to 1992 for Ontario.

6. The percentage shown for Illinois does not include Chicago.

Figure 2: Water use in the Great Lakes Basin.



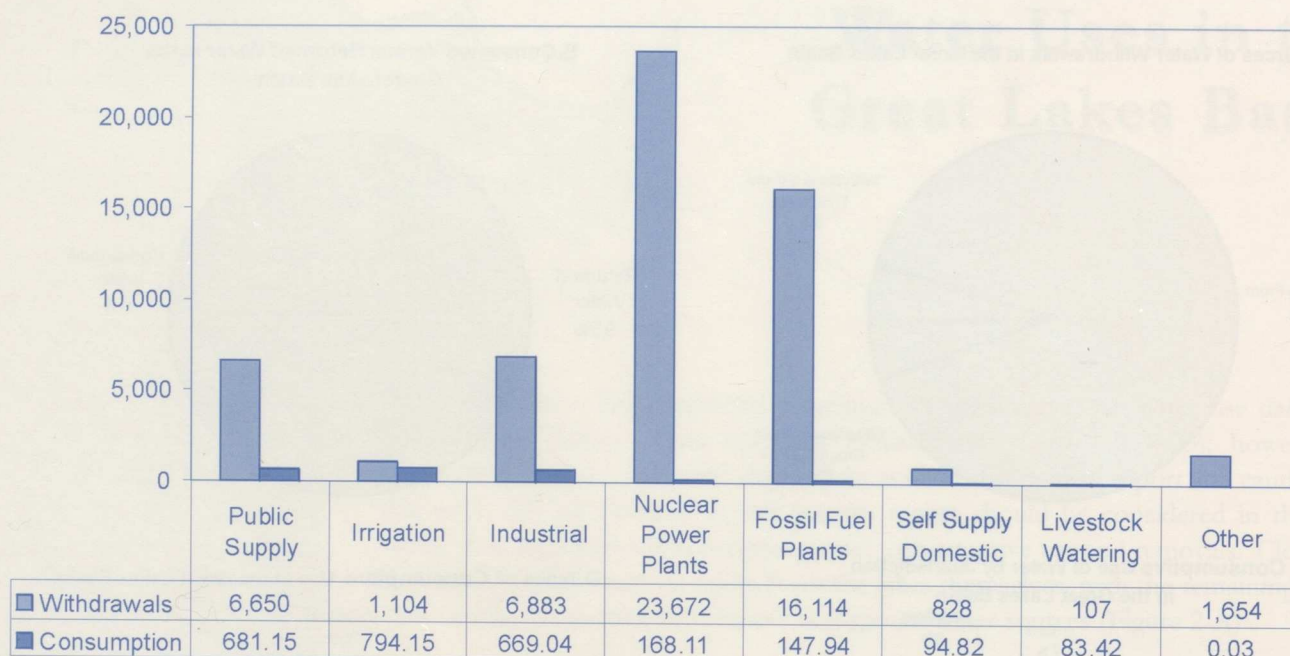
The percentage of withdrawn water that is consumed within the Great Lakes system varies with the type of use to which the water is put. When water is used for irrigation, about 80 percent is consumed. At the other extreme, when water is used for thermoelectric power, less than 1 percent is consumed. The percentage of water lost to the Basin when it is used for public supply and for industrial purposes—the other large water-using categories—is on the order of 10 percent for each (Figure 3).

Consumptive use data for groundwater are not available. Groundwater withdrawals, however, amount to about 5 percent of total withdrawals in the Basin. This figure, however, greatly understates the importance of groundwater to the

Basin population. For example, in the U.S. portion of the Basin, groundwater is the primary source of water for about 3.3 million of the 17 million people served by public supplies in the region. It is also the source of water for many of the 4.9 million people who supply their own water. The effects of groundwater withdrawal may therefore be of concern on a local or subregional basis, particularly with respect to urban sprawl, even if withdrawals do not have a major impact on the overall water budget of the Basin.

Based on a very preliminary analysis, growth in withdrawals and consumptive use in the Basin appears to have slowed. In the International Joint Commission's 1985 *Great Lakes Diversions and Consumptive Uses* report, consumptive use in the

Figure 3: Withdrawals and consumptive uses in the Great Lakes Basin (in millions of liters per day).



Great Lakes Basin was estimated to be in a range of about 82 cms (2,900 cfs) to 159 cms (5,600 cfs) in 1980. Information from the Regional Water Use Data Base suggests that consumptive use in 1993 was still near the middle of that range, which would be consistent with a more general leveling off of water use in North America. This area will receive further attention in the final report.

The Commission's study team developed preliminary insights into trends in water use and their impact on potential future water demands. These insights were derived from a simple extension of trends established over the previous decade⁷. There is a good deal of uncertainty involved in this type of analysis. Factors such as climate change could encourage the increased use of water for irrigation and other purposes. On the other hand, changes in water demand management as well as water conservation might help to slow any increase in consumptive use within the Basin. Work is continuing to define the magnitude and direction of the

uncertainty. Preliminary results suggest that the trend analysis likely represents a best-case scenario and that there is a greater probability of increasing use in the future than there is of decreasing use. Results, presented below, extend to 2020–21. It is the view of the Commission that projections beyond two decades should be considered highly speculative.

Thermoelectric Power Use. At thermoelectric power plants, water is used principally for condenser and reactor cooling. In the United States, thermoelectric withdrawals have remained relatively constant since 1985 and are expected to remain near their current levels for the next few decades. In Canada, modest increases are expected to continue along with population and economic growth.

Industrial and Commercial Use. In the United States, industrial and commercial water use has declined in response to environmental pollution legislation, technological advances, and a change in the industrial mix from heavy

7. The analyses in both Canada and the United States relied, to the extent possible, on the methodology reported on in a recent U.S. Department of Agriculture report. For Canada, the analysis was conducted to the year 2021 by Gaia Economic Research Associates. For the United States, the analysis extended to the year 2040 and was conducted by the U.S. Geological Survey. Compatible results for the two countries may be available for the Commission's final report.

metal production to more service-oriented sectors. A similar trend is evident in Ontario, so combined use is expected to gradually decline through 2020.

Domestic and Public Use. In the United States, water use for domestic and public purposes in the Great Lakes Basin generally increased from 1960 to 1995 and is expected to climb gradually through 2020. On the other hand, because of aggressive water-conservation efforts in Ontario, a modest downward trend established in recent years is expected to continue.

Agriculture. In the United States, water used for agriculture in the Great Lakes region increased fairly steadily from 1960 to 1995. In Canada, the rate of increase was somewhat larger, so that combined projections indicate a significant increase by 2020.

Total Water Use. If current trends continue, total water use in the Canadian portion of the Basin is expected to increase by close to 20 percent between 1996 and 2021. On the other hand, a small decrease of about 2 percent is expected in the U.S. portion of the Basin between 1995 and 2020, although U.S. use is expected to begin rising again after that time. The combined projections indicate a modest increase of about 5 percent for the entire Basin between 1995-96 and 2020-21. It must be stressed that these results should be considered indicative only.

Removals

Removals are waters that are conveyed outside their basin of origin by any means. The following paragraphs discuss current removals by diversion, other types of removals such as removal by marine tanker, bottled water, or ballast water, and the potential for future diversions and other removals. Past diversion and removal proposals are summarized in Appendix 5.

Current Diversions. Water diversions into and out of the Great Lakes Basin are summarized in Figure 3 and by the accompanying data in Table 1.

The Chicago Diversion from Lake Michigan into the Mississippi River system is the only major diversion out of the Great Lakes Basin. The Longlac and Ogoki diversions into Lake Superior from the Albany River system in northern Ontario are the only major diversions into the Basin. The Longlac and Ogoki diversions represent 6 percent of the

supply to Lake Superior. At present, more water is diverted into the Great Lakes Basin through the Longlac and Ogoki diversions than is diverted out of the Basin at Chicago and by several small diversions in the United States. If the Longlac and Ogoki diversions were not in place, water levels would be 6.0 cm (2.4 in.) lower in Lake Superior, 11 cm (4.3 in.) lower in Lakes Michigan-Huron, 6.0 cm (2.4 in.) lower in Lake Erie, and 7.0 cm (2.8 in.) lower in Lake Ontario. In addition to these diversions in and out of the Great Lakes Basin, the Welland and Erie Canals divert water between sub-basins of the Great Lakes and are considered intrabasin diversions.

Aside from these major diversions, there are also a few small diversions. In the 19th century, a diversion was built at Forrestport, New York, to divert waters of the Black River in the Great Lakes Basin into the Erie Canal and the Hudson River watershed. During the same century, the Portage Canal was constructed in Wisconsin, diverting Wisconsin River waters (Mississippi Basin) into the Great Lakes Basin and providing a transportation link between the basins. Both the Erie and Portage Canals are used today for recreational purposes. In recent years, London, Ontario, and Detroit have taken water from Lake Huron for municipal purposes. London and Detroit have discharged their effluent to Lake St. Clair and the Detroit River, respectively. The Raisin River Conservation Authority has, with the approval of the International Joint Commission, taken water from the international section of the St. Lawrence River to maintain summer flows in the Raisin River. The communities of Pleasant Prairie, Wisconsin, and Akron, Ohio, which lie outside the Great Lakes Basin, have obtained permission, under U.S. law (the Water Resources Development Act of 1986), to take water from the Great Lakes on the condition that they return an equivalent volume of water over time to the Basin. Lastly, in 1997, a small diversion was built in Haldimand, Ontario.

Other Removals. Public concern has been focused on the potential movement of freshwater in bulk beyond the Great Lakes Basin by ocean tankers. To date, no contracts are in place, and no regular trade has begun to ship water in bulk from the Great Lakes Basin or from North America as a whole. For almost two decades, however, entrepreneurs have actively pursued foreign markets and have sought approval to export from jurisdictions on both the west and east coasts. Alaska, Newfoundland, and Quebec currently are entertaining proposals to export freshwater in bulk by ocean tankers. Thus far, companies in these jurisdictions have captured only small markets for bottled water.

Figure 4: Existing diversions in the Great Lakes Basin.

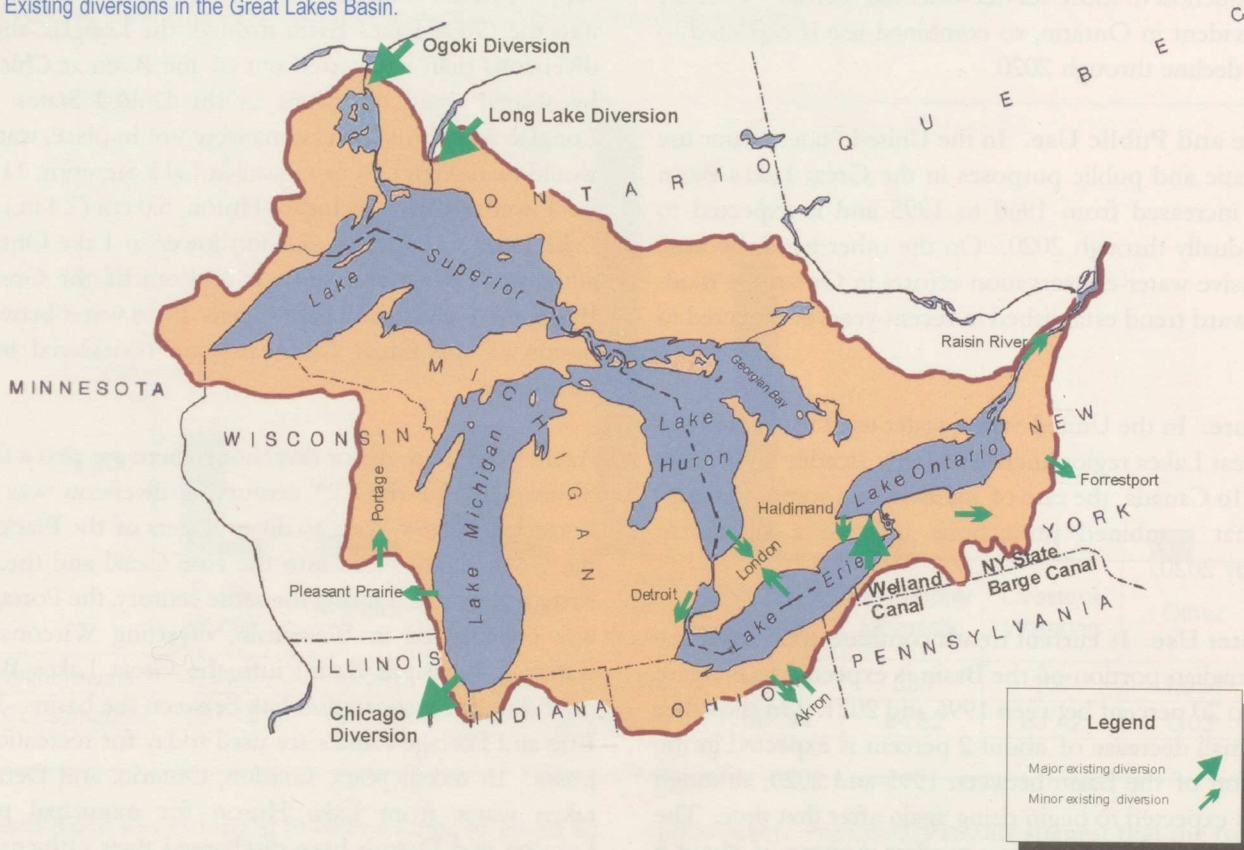


Table 1: Existing diversions in the Great Lakes Basin - Data.

Existing Diversions in the Great Lakes Basin	Date Operational	Average Annual Flow (CMS) (CFS)	
1. Interbasin			
Long Lake (into Lake Superior)	1939	45	1,590
Ogoki (into Lake Superior)	1943	113	3,990
Chicago (out of Lake Michigan)	1900	91	3,200
Forrestport (out of Lake Ontario)	1825	3	120
Portage Canal (into Lake Michigan)	1860	1	50
Pleasant Prairie (out of Lake Michigan)	1990	0.1	5
Akron (out of and into Lake Erie)	1998	0.1	6
2. Intrabasin			
Welland Canal	1932	260	9,200
NY State Barge Canal (Erie Canal)	1918	20	700
Detroit	1975	4	145
London	1967	3	110
Raisin River	1968	0.7	25
Haldimand	1997	0.1	2

The Commission has conducted a preliminary analysis of bottled water statistics. The results of the analysis show that Canada is a net exporter of bottled water, and the United States is a net importer of bottled water. The available data strongly suggest that bottled water is a net contributor of water to the Great Lakes Basin. In 1998, 656 million liters (173 million gallons⁸) were imported by the two countries combined, and 301 million liters (79 million gallons) were exported.

Trade in other types of beverages is believed to be of a similar order of magnitude. For example, 272 million liters (72 million gallons) of bottled water were exported in 1998 from all of Canada to the United States. That represented 33 percent of all beverage exports from Canada to the United States, compared with 44 percent for beer and 19 percent for soft drinks. Considering the extremely small magnitude of trade in bottled water and other beverages, it would appear both impractical and unnecessary to treat them any differently than any other products that either include water or use water in their production processes.

In July 1999, there was a flurry of media interest in the bottled water situation in Ontario. According to media reports, the Ontario government had issued permits authorizing the withdrawal of 18 billion liters (4.8 billion gallons) of water per year for bottling purposes, almost all from groundwater sources. Only about 4 percent of this volume is currently being withdrawn, amounting to a flow of 0.02 cms (0.7 cfs). It appears that most of this water remains within the Great Lakes Basin. While the Commission is sensitive to the potential importance of this matter to local groundwater regimes, at this time it is not believed to be a significant issue with respect to Great Lakes waters.

Ballast water, which is used to stabilize vessels when they are not carrying commercial cargo, has always been considered a noncommercial item. No evidence has been found to suggest that any ballast water taken from the Great Lakes Basin is sold abroad. It should be noted that, in part, because water quality is not an issue for the purpose of establishing ballast, discharging ballast water can lead to the introduction of exotic species, which are now prevalent throughout the Great Lakes Basin. Over a recent nine-year period, the net loss of water from the Great Lakes Basin as a result of ships taking on ballast water in the lakes was equivalent to a flow of 0.02 cms (0.7 cfs).

Appendix 5 provides a summary of past diversion and removal proposals.

Potential for Future Diversions and Removals. The Commission believes that the era of major diversions and water transfers in the United States and Canada has ended. Barring significant climatological shifts, an overcoming of engineering problems and of numerous economic and social issues, and an abandonment of national environmental ethics, the call for such diversions and transfers will not return. At present, there do not appear to be any active proposals for major diversion projects either into or out of the Basin, and there is little reason to believe that such projects will become economically, environmentally, and socially feasible in the foreseeable future.

Mega-diversions would present many engineering challenges. While most of these could be overcome, the costs of such projects, whether by pipeline or channel, remain enormous. Not only must capital be invested in the construction of the project, but also operating and maintenance funds must be found to support the effort. Every study of such projects has highlighted the high energy costs associated with the pumping of water over topographic barriers. Mega-diversions also require rights-of-way for their passage and security for the products being transported, which would be most difficult to obtain. The environmental costs of such projects in terms of disruption of habitat and species movement are enormous. A project similar to the current California Aqueduct would represent 75 percent of the current consumptive use in the Great Lakes Basin and would, *prima facie*, have a major environmental impact on aquatic and terrestrial resources.

Even if such mega-diversions were technically feasible, it would be impossible for the Great Lakes jurisdictions to guarantee an uninterrupted supply. Some interests in the Great Lakes Basin, such as riparian homeowners, might welcome a means of removing water from the Basin during periods of extremely high levels. Most interests, including in-stream interests, commercial navigation, and recreational boating, would be adamantly opposed to such removals in periods of low levels. Diversions during droughts would, however, be difficult to interrupt because of the dependency that diversions create among recipients. The Commission recognizes that once a diversion to a water-poor area is permitted, it would be very difficult to shut it off at some time in the future.

8. In this report, all figures given in gallons are given in U.S. gallons.

In the short run, pressures for small removals via diversion or pipeline are most likely to come from growing communities in the United States just outside the Great Lakes Basin divide. In Ontario, because of geography, there are currently no such pressures, nor are there likely to be in the future.

At a lesser level, water may be transferred in bulk by trucks or marine tankers. The geography of the region is such that the commercial viability of long-distance trade in bulk water from the Great Lakes appears uneconomical. Moreover, other countries with abundant water supplies are located much closer to prospective foreign markets than are the Great Lakes. Even the California-Mexico border region could be served more effectively from the Pacific Northwest and Alaska than from diversions or ocean tankers drawing water from the Great Lakes.

Towing large fabric bags filled with water is a variation on freshwater export by ocean tanker. This technique has been used since late 1997 to provide water from the mainland to some of the Greek islands and to the Turkish part of

Cyprus. Apparently, these short-haul arrangements in the Mediterranean have reduced the cost of delivery to under \$1 U.S. per cubic meter, but the confines of the Great Lakes-St. Lawrence system and longer ocean distances may rule out use of this technology in the Great Lakes Basin.

Throughout the world, major efforts are underway to find economically feasible alternatives to interbasin transfers of water. Treated domestic and industrial waste waters are being used for many purposes, including lawn watering and agricultural irrigation. As demand for urban water supplies increases, communities are seeking to manage their demands rather than increase their supplies. In some areas, implementation of conservation techniques has reduced demand by as much as 50 percent. In other areas, water rights markets have shifted available water from agricultural to urban uses. Techniques to desalinate ocean waters are becoming increasingly more economical. By late 2002, Tampa, Florida, will begin blending desalinated water with freshwater at costs competitive with development of new freshwater sources.

Section 4



Cumulative Effects

Human intervention has affected the Great Lakes ecosystem at the local level as well as at the systemwide level, and the effects (impacts) are both short-term and long-term. The Commission has identified the basic physical (abiotic or nonliving) impacts of human use and activity on the current level of waters in the Basin and is working to identify the ensuing impacts of these and possible future changes on the living components of the ecosystem. The bulk of this latter analysis will be carried out during the next several months.

Existing consumptive uses have lowered the levels of the Great Lakes from less than 1 cm (0.4 in.) to 6 cm (2.4 in.) (Table 2). This impact has been far exceeded by other anthropogenic activities. The inflows from the Longlac and Ogoki diversions have raised lake levels, and the outflows from inter- and intrabasin diversions have lowered lake levels. The greatest impact on lake levels has come from the channel work on the St. Clair and Detroit Rivers; this dredging and mining for gravel has lowered the levels of Lakes Michigan and Huron by 40 cm (15.8 in.). The orders of approval governing the operations of the structures on the St. Marys and St. Lawrence Rivers have established desirable ranges for levels in Lakes Superior and Ontario to avoid very low or very high levels and the consequent impacts that very low and very high levels have on Great Lakes interests.

There is interaction among these changes, bringing about cumulative impacts. Cumulative impacts in ecosystems involve past, present, and reasonably foreseeable effects that are seldom simply the sum of the changes.

The impact of the changes in levels on the ecosystem as a whole, and especially on its lake and river subsystems, is not well understood. The Commission is not aware of any assessments of the overall ecosystem effects of water diversions, although certain issues have been investigated at a smaller scale.

While changes to lake levels and outflows are relatively easy to determine, the impact of those changes is subject to interpretation. For example, construction of the power and navigation projects on the St. Lawrence River in the late 1950s forever changed the character of the river. Some argue that the environmental changes brought about by the project have done incalculable harm. Others have built their lives on the basis of the new river-lake system and would be devastated by a return to pre-project conditions. In fact, the overall effects of the changed regime have not been fully assessed.

Table 2: Impacts of diversions, consumptive use and outlet channels modifications.

On Lake Levels in Centimeters

	Superior	Michigan - Huron	St. Clair	Erie	Ontario
	Mean	Mean	Mean	Mean	Mean
Recorded Levels 1918-1997 (meters)	183.43	176.49	175.02	174.15	74.75
Longlac-Ogoki (160 cms) (inflows)	6	11		8	7
Chicago (90 cms) (outflows)	-2	-6		-4	-3
Welland Canal (260 cms)	-2	-6		-13	0
Detroit-St. Clair modifications	0	-40		0	0
Niagara River outlet	0	3		12	
Existing consumptive uses (1993)	-1	-5	-5	-4	-6
Total impact (cm):	1	-43	-5	-1	-2

On Flows in Connecting Channels in Cubic Meters per Second

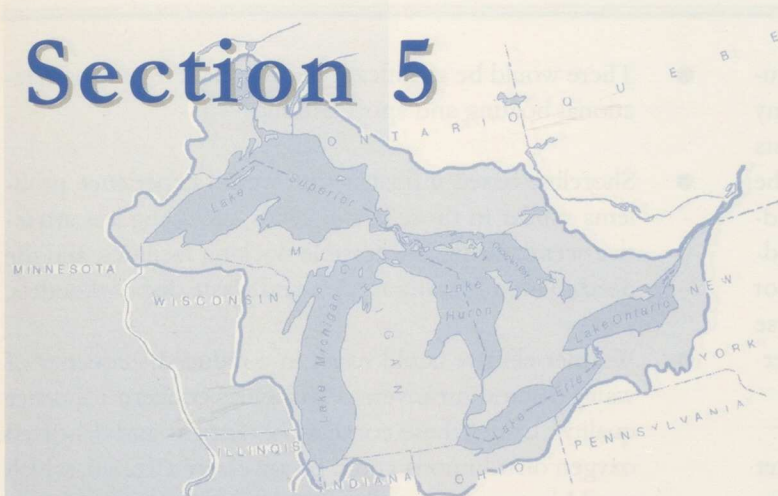
	St. Mary's R.	St. Clair R.	Detroit R.	Niagara R.	St. Lawrence R.
	Mean	Mean	Mean	Mean	Mean
Recorded Flows 1918-1997 (cms)	2150	5200	5350	5940	6980
Total impact (cms)	-10	-50	-50	-90	-100

Looking ahead to the 21st century, there is a great deal of uncertainty regarding factors such as future consumptive use, small-scale removals of water, and global climate warming. Despite this uncertainty, present indications are that all three factors are likely to place downward pressures on water levels with reinforcing impacts. Although there are insufficient data and inadequate scientific understanding to place precise

estimates on the magnitude and timing of such impacts, the impacts could be significant. This—and the prospect of adverse cumulative impact of new human interventions—suggests a need for extreme caution in dealing with those water use factors that are within the control of Basin managers.

Section 5

Climate Change



Today, after 20 years of active debate since the 1979 World Climate Conference, there is still considerable disagreement over how fast human-induced climate change will take place, how extreme it will be, how dangerous such changes will be for ecosystems, including socioeconomic systems, and just how aggressively the global community should seek to mitigate the issue. There is nevertheless a reasonably strong consensus that the science is sound and that "the balance of evidence suggests that there is discernible human influence on the climate system".

In recent decades, scientists have become increasingly concerned about changes taking place in the atmosphere, particularly the increasing concentrations of greenhouse gases. As the 20th century draws to a close, there is growing evidence that the changing composition of the atmosphere is beginning to influence specific components of the hydrologic cycle, even though it is not yet possible to differentiate such effects from the natural variability of Great Lakes levels. Over the past several decades, trends in hydrologic variables in the Basin or in the vicinity of the Basin have been generally consistent with changes projected by climate change models, in terms of increases in temperature, precipitation, and evaporation. These research results are generally what would be expected with "enhanced greenhouse effect" warming.

Computer climate models have been used to explore impacts on various water-related interests, assuming likely scenarios of future atmospheric greenhouse gas concentrations. Most models suggest global warming will result in a lowering of water supplies and lake levels and a reduction in outflows from the Basin. Based on projections using several state-of-the-art models, experts from the U.S. National Oceanic and Atmospheric Administration (NOAA) and Environment Canada believe that global warming could result in a lowering of lake level regimes by up to a meter or more by the middle of the next century, which would cause severe economic, environmental, and social impacts throughout the Great Lakes region. However, given the large discrepancies in some of the model results, there continues to be a high degree of uncertainty associated with the magnitude and timing of potential changes.

The question, therefore, with respect to average Great Lakes levels, is whether, in the long term, increases in evaporation will significantly exceed increases in precipitation, thereby reducing net water supplies. Although most scientific evidence suggests that

9. Intergovernmental Panel on Climate Change (IPCC). IPCC Second Assessment Synthesis of Scientific-Technical Information Relevant to Interpreting Article 2 of the UN Framework Convention on Climate Change. Cambridge University Press, New York, 1996.

this will be the case, it is impossible, at this time, to conclusively differentiate shorter-term natural variability from any longer-term trend. Great Lakes levels and lake level interests are highly sensitive to climatic variability, as illustrated by the impact of high water levels in the early 1950s and the mid-1980s and of low water levels in the 1930s and the mid-1960s. Significant variability will continue whether or not human-induced climatic change is superimposed on these natural fluctuations. From a policy perspective, this uncertainty does not alter the risk posed by climate change.

Climate change suggests that at least some lowering of water levels is likely to occur. The Commission's study team examined this subject and found that should this lowering occur, the factors noted below may be indicative of some of the impacts that could be significant for the economy, the social fabric, and the ecosystem of the Great Lakes region. It should be noted that adaptation measures would moderate some of these impacts.

- There would be losses in hydroelectric power generation. Even though not nearly as severe as those projected in climate change scenarios, record low levels and flows in the 1960s caused hydropower losses of between 19 percent and 26 percent on the Niagara and St. Lawrence Rivers. A small proportion of these losses would be offset by lower heating costs, which in turn would be offset somewhat by increases in air conditioning costs.
- Great Lakes shipping costs could increase significantly because of reduced drafts in shipping channels and increased dredging costs. At least some of these costs might be offset by a longer shipping season.
- Flood damage in shoreline areas would decrease as long as new development was not permitted to encroach on the newly exposed land.

- There would be significant detrimental effects on recreational boating and sport fishing.
- Shoreline-based infrastructure would experience problems similar to those in the 1960s, including less attractive scenic views, inaccessible docking facilities, and the need to modify water intakes and waste disposal outlets.
- Warmer climate could result in a reduced frequency of water column turnovers, a particular concern for water quality. Under these conditions, nutrient and dissolved oxygen distributions could be adversely affected, which would in turn have an impact on fish species and their habitat.
- A reduction in the water levels of Montreal Harbour would have a major effect on all overseas commercial navigation. The adaptation measures could include significant channel dredging.
- Finally, there could be reductions in freshwater discharges into the St. Lawrence estuary, gulf, and beyond, affecting fish populations and other components of the St. Lawrence and Atlantic ecosystems.

Assuming that climate change occurs as projected, with impacts similar to those described above on the Basin ecosystem, it should not be assumed that these changes would take place gradually over the decades. Human-induced climate change will be superimposed on normal climate variability and events like El Niño. The Commission believes therefore that considerable caution should be exercised with respect to any other factors potentially placing downward pressures on water levels and outflows.

Section 6

Groundwater



Groundwater is a source of water for many segments of the Great Lakes community. Some members of the biotic community, e.g., cave-dwelling fish and cave-dwelling insects, spend all of their lives underground and are completely dependent upon groundwater. Groundwater's contribution to stream flow is significant, as it ultimately affects lake levels.

Groundwater discharge is a significant determinant of the biological viability of tributary streams. In undisturbed areas, groundwater discharge throughout the year provides a stable inflow of water with generally consistent dissolved oxygen concentration, temperature, and water chemistry. In disturbed areas where, for example, land uses have significantly reduced groundwater flow to a stream, stream reaches may experience diminished biological viability. Where land uses add contaminants, streams may also lose viability.

In the Great Lakes Basin, the groundwater system is recharged mainly by infiltration (percolation) of precipitation. Withdrawal of groundwater at rates greater than the recharge rate causes water levels in aquifers to decline. If the amount of decline is sufficient, water may be drawn from streams or lakes into the groundwater system, thus reducing the amount of water discharging to the Great Lakes. This is indicative of the inextricable link between ground and surface waters.

Groundwater withdrawals at rates high enough to be measured are taking place at a number of locations. The best known is in the Chicago–Milwaukee metropolitan area where, in 1980, over 300 cms (10,000 cfs) were withdrawn from the Cambrian–Ordovician aquifer system. This large-scale pumping produced cones of depression in aquifers under Milwaukee and Chicago, with declines in the levels of groundwater as great as 114 and 274 m, respectively (375 and 900 ft., respectively). As a result of lower pumping rates since 1980, groundwater levels in the Chicago area have recovered as much as 76 m (250 ft.) in some localities, but groundwater levels are continuing to decline in the southwestern part of the Chicago metropolitan area.

Groundwater consumption and groundwater recharge in the Great Lakes Basin are not well understood. Reasons for this include the following:

- There is no unified, consistent mapping of boundary and transboundary hydrogeological units.

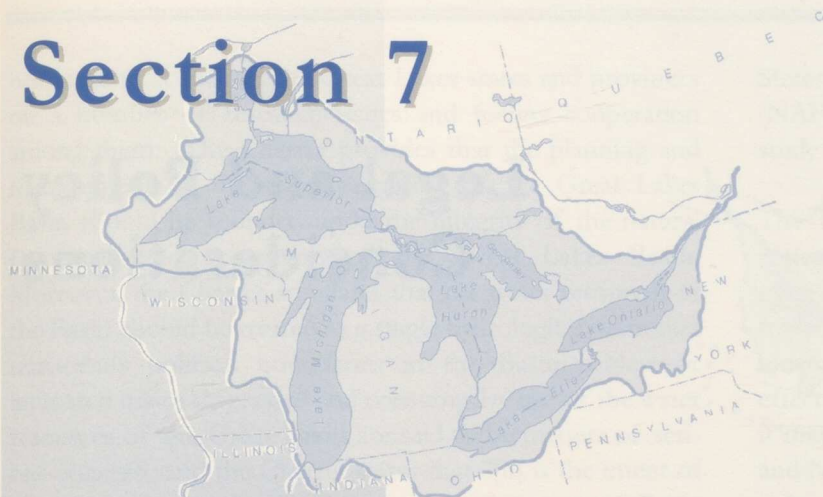
- There is no comprehensive definition of the role of groundwater in supporting ecological systems.
- There is a lack of information on consumptive use.
- There are no simplified methods for identifying large groundwater withdrawals near boundaries of hydrologic basins.
- Estimates are needed of the effects of land-use changes and population growth on groundwater availability and quality.
- There is a lack of information on direct groundwater discharge to surface water streams and to the Great Lakes.
- There is no systematic estimation of natural recharge areas.

Although much is unknown about groundwater, the uncertainties do not hamper policy formulation with respect to lake levels. Whether consumption is from the lakes, the tributaries, or groundwater, the impact on average lake levels is virtually identical.

Groundwater basins (aquifers) may have boundaries that are considerably different from the boundary of the surface water basin under which these groundwaters lie. In fact, there may be several groundwater basins layered at different depths, and each of these groundwater basins may have a boundary that does not coincide with the boundary of the surface water basin under which it is found. Accurate mapping of groundwater basins has the potential to bring about changes in how we manage the withdrawal of groundwater as well as how we manage the interlinked surface waters.

Section 7

Conservation



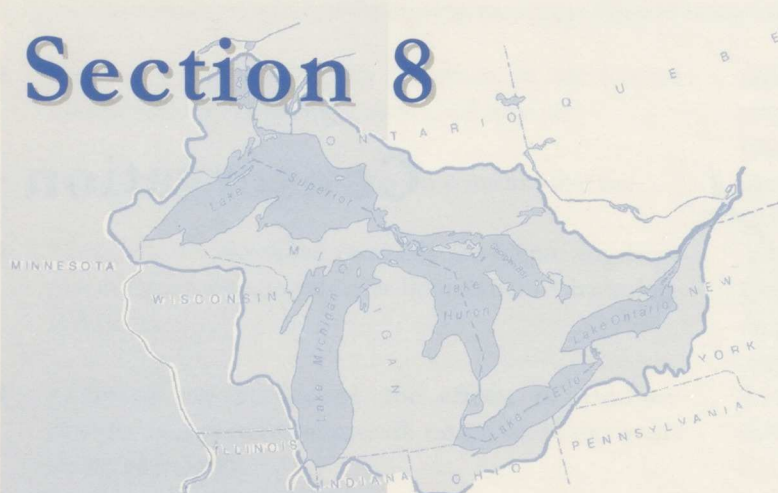
The first step in sound management of resources and the exercise of the precautionary principle is conservation. Some consumption, of course, is essential to the functioning of the human element of ecosystems. Currently, consumptive use in the Great Lakes Basin is relatively small and is likely to experience only modest increases into the foreseeable future. However, global warming will likely increase and change patterns of consumptive use; in particular, average higher temperatures in the Basin could result in increased agricultural activity and water consumption in the longer term. Because of a possible downward trend in net Basin supply in the 21st century, water conservation and demand-management practices should become increasingly important components of any overall sustainable use strategy.

Experience has shown that conserving water by using it more efficiently makes sound economic and environmental sense in that, among other things, infrastructure costs for water supply and wastewater treatment are reduced; energy use is reduced; cost efficiencies are increased by reducing the volumes of water and waste to be treated; resiliency of the ecosystem is improved by reducing withdrawals; and exemplary behavior is demonstrated to others.

On a basinwide scale, implementation of the Basin Water Resources Management Program, to which the states and provinces are committed under the Great Lakes Charter, could provide the opportunity to launch a water-conservation initiative. Sharing of conservation experiences among Basin jurisdictions should be an integral part of the overall approach to cooperative programs and practices. Cooperating jurisdictions may wish to adopt some common approaches, as appropriate, in their water-conservation plans, including incentives to encourage water demand-management initiatives and the installation of best practicable water-saving technology.

Demand management shifts traditional thinking away from going after new water supplies to more efficient use of the resource. Central to the concept of demand management is the setting of prices in such a way that the amount of water used by any activity is a function of price. Much can be done in many areas of the Basin to use water more efficiently by such measures as adopting metering of all water facilities and moving more assertively to recovering the full costs of providing water services.

Section 8



Legal and Policy Considerations

Water management in the Great Lakes Basin is governed by a network of legal regimes, including international instruments and customs, federal laws and regulations in both Canada and the United States, the laws of the eight Great Lakes states and Ontario and Quebec, and the rights of Aboriginal peoples and Indian tribes under Canadian and U.S. laws. This section is not intended to be a full discussion of all legal issues; rather it is intended to be a preliminary identification of aspects of the legal regime that bear most directly on the issues raised in this report.

The International Legal Context

Boundary Waters Treaty. The Boundary Waters Treaty of 1909 is the primary international legal instrument governing the use of the waters of the Great Lakes Basin. The treaty established certain basic legal principles to deal with boundary and transboundary waters and created the International Joint Commission to help implement portions of the treaty. For over 90 years, the treaty has been effective in assisting Canada and the United States to avoid and resolve disputes over freshwater.

Under the treaty, boundary waters (i.e., the waters along which the boundary passes) are treated differently from transboundary rivers or tributaries. Thus, the treaty does not deal with all waters of the Great Lakes Basin in the same way. With some exceptions, Article III provides that the use, diversion, or obstruction of boundary waters must be approved by the Commission if water levels or flows on the other side of the boundary are to be affected. With respect to tributaries of boundary waters and transboundary rivers, however, Article II states that each nation reserves "the exclusive jurisdiction and control over [their] use and diversion." The treaty does not explicitly refer to groundwater.

The treaty also provides that the governments of the United States and Canada may refer issues to the International Joint Commission to investigate and make recommendations on, in order to help the countries resolve and avoid disputes along the border. This provision of the treaty has been used many times over the years to address water quality and water quantity issues in the Great Lakes and elsewhere.

Great Lakes Charter. The 1985 Great Lakes Charter is an arrangement among the Great Lakes states and the provinces of Ontario and Quebec. Although the Charter is

not binding, it focuses the Great Lakes states and provinces on a number of resource issues and fosters cooperation among them. The Charter provides that the planning and management of the water resources of the Great Lakes Basin should be founded upon the integrity of the natural resources and ecosystem of the Great Lakes Basin. Moreover, the Charter stipulates that the water resources of the Basin should be treated as a single hydrologic system that transcends political boundaries in the Basin. New or increased major diversions and consumptive use of the water resources of the Great Lakes are said to be matters of serious concern, and the Charter states that "[it] is the intent of the signatory states and provinces that diversions of Basin water resources will not be allowed if individually or cumulatively they would have any significant adverse impacts on lake levels, in-basin uses and the Great Lakes Ecosystem."

The Charter provides that no state or province will approve or permit any major new or increased diversion or consumptive use of the water resources of the Great Lakes Basin without notifying and consulting with and seeking the consent and concurrence of all affected Great Lakes states and provinces. The trigger point for notification and for seeking the consent and concurrence of other Great Lakes states and provinces is an average use of 5 million gallons (19 million liters) per day in any 30-day period.

The Great Lakes Charter also records a commitment by the signatory states and provinces to pursue the development and maintenance of a common base of data and information regarding the use and management of Basin water resources, the establishment of systematic arrangements for the exchange of water data and information, the creation of a Water Resources Management Committee, the development of a Great Lakes Basin Water Resources Management Program, and additional coordinated research efforts to provide improved information for future water planning and management decisions. Although not fully implemented, these commitments point toward the kind of cooperation and coordination that is required in the future.

International Trade Law. One issue raised by governments in the Reference was whether international trade obligations might affect water management in the Basin. To address this issue, the Commission, with the assistance of the study team, reviewed the relevant World Trade Organization agreements, including the General Agreement on Tariffs and Trade (GATT) as well as the Canada–United States Free Trade Agreement (FTA) and the Canada–United

States–Mexico North American Free Trade Agreement (NAFTA) and relevant case law. The Commission and its study team also consulted experts in the field.

The Commission's initial analysis indicates that it would appear unlikely that water in its natural state (e.g., in a lake, river, or aquifer) is included within the scope of any of these trade agreements since it is not a product or good, and indeed the NAFTA parties have issued a statement to this effect. When water is "captured" and enters into commerce, it may, however, attract obligations under GATT, the FTA, and NAFTA.

The key GATT provision with possible significance for water exports is the prohibition of quantitative restrictions in Article XI. The GATT, however, creates a number of exceptions. Of these, the most relevant to trade in water would appear to be those related to measures "necessary to protect human, animal, or plant life or health" or "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption." With respect to the former, there has been some debate as to whether this provision should be read broadly, so as to in effect create an "environmental" exception to the GATT, or narrowly, so as to embrace essentially traditional concerns related to sanitary and phytosanitary measures. With respect to the latter, there may be a question as to whether water is an exhaustible natural resource, although this raises less of a problem in the case of a discrete ecosystem such as the Great Lakes Basin where only a small part of the resource is replenished annually. Both exceptions are qualified by a requirement that they "[not] be applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade."

While dispute-settlement panels considering these GATT exceptions have affirmed, in principle, that trade interests may have to give way to legitimate environmental concerns, it is also true that the same panels have questioned very closely whether measures nominally taken for environmental reasons have underlying protectionist elements. Clearly, then, the achievement of a coherent and consistent approach to water conservation and management in the Great Lakes Basin—an approach clearly grounded in environmental policy—would be an important step in addressing any trade-related concerns with respect to the use of Basin waters.

The NAFTA trade obligations with respect to goods, while rooted in the GATT, appear to constrain the availability of certain GATT exceptions—including the conservation exception—in some important ways, in effect making it more difficult to "turn off the tap" once trade in water has been established. These constraints do not, however, apply to the health exception, and the NAFTA wording of that exception specifically provides that it is understood by the parties to include environmental measures. NAFTA also makes provision for certain trade obligations in environmental/conservation agreements to prevail in the event of a conflict. Finally, it should be recalled that following the signing of NAFTA, the three parties issued a joint declaration that NAFTA creates no rights to the natural water resources of any party; that unless water, in any form, has entered into commerce and become a good or product, it is not covered by the provisions of any trade agreement, including NAFTA; and that international rights and obligations respecting water in its natural state are contained in separate treaties, such as the Boundary Waters Treaty, negotiated for that purpose.

The Commission, at this time, is not aware of provisions of international trade law that would prevent Canada and the United States from taking measures to protect their water resources and preserve the integrity of the Great Lakes Basin ecosystem, so long as there is no discrimination by decision makers against individuals from other countries in the application of those measures. The Commission is continuing to examine these issues and will address them further in its final report.

The Domestic Legal Context

In Canada. The constitutional underpinnings of Canadian water law are found in the Constitution Act. Because water is not treated as a separate head of power in that act, the respective federal and provincial roles in water management can be found under a number of constitutional headings that may be either legislative or proprietary in nature.

Federal legislative jurisdiction over water is rooted in several heads of power. The most obvious are the specific federal responsibilities for navigation and shipping and for sea coast and inland fisheries. Other headings, such as trade and commerce, Indians and lands reserved for Indians, agriculture (a power exercised concurrently with the provinces), criminal law (especially with respect to pollution), and undertakings (including canals) connecting or extending beyond the limits

of a province, are also relevant. Two other more general grants of legislative authority are also relevant. The first is the power of the federal government to implement treaties concluded by the British Empire on Canada's behalf. This power supports the International Boundary Waters Treaty Act, but it has not been extended to treaties concluded by Canada in its own right. The second general grant of legislative authority is the power to make laws for the "peace, order and good government" of Canada. While this power has had a checkered history, it has been used to justify federal authority over marine dumping within provincial waters, and it could take on significance with respect to issues such as climate change that are determined to have a primarily national or international character.

Apart from its legislative powers, the federal government also exercises certain proprietary rights that may involve a water management role. These include ownership of specified public works such as canals (and connected lands and water power), public harbors, lighthouses and piers, river and lake improvements, lands set apart for general public purposes, and national parks.

While the federal government exercises jurisdiction over water management primarily through its legislative authority under the Constitution Act, provinces also derive important authority from their proprietary rights. The Constitution Act provides, with limited exceptions, for provincial ownership of all public lands (including water). The legislative powers of the provinces largely buttress their proprietary powers and include authority with respect to management and sale of public lands, local works and undertakings, property and civil rights in the province, and generally all matters of a local or private nature.

There is no plenary federal legislation with respect to water. Historically, the primary interest of the federal government in water management has been focused on its constitutional responsibilities for fisheries (through the Fisheries Act), navigation (through the Navigable Waters Protection Act), and international relations, although it has in recent years taken a role in water quality, particularly with respect to toxic substances.

The most ambitious attempt by the federal government to legislate in a comprehensive fashion with respect to water was the Canada Water Act of 1970. The act emphasizes federal-provincial cooperation and includes provisions for unilateral federal action on transboundary issues. In practice,

however, the federal role envisaged in the act has not been fully realized. The International Rivers Improvements Act also has potential application to some water withdrawals with transboundary aspects. The act requires a licence for international river improvements. The definition of an international river is very broad and would include, for example, a transboundary water pipeline.

The International Rivers Improvement Act is, however, subject to two important exceptions: It does not apply to improvements situated within boundary waters as defined by the Boundary Waters Treaty, nor does it apply to improvements "constructed, operated or maintained solely for domestic, sanitary or irrigation purposes, or other similar consumptive uses." In sum, as with other federal legislation, it is not designed to provide a general mechanism for dealing with water removals, and it would not even apply to schemes that do not involve a physical "work" of some kind.

The Ontario Water Resources Act (OWRA) prohibits the withdrawal of more than 50,000 liters (13,209 gal.) of water a day from a well or from surface waters without a permit. Ontario's recently issued Water Taking and Transfer regulation, among other things, prohibits the transfer of water out of the Great Lakes Basin, subject to certain exceptions.

In Quebec, the Civil Code contains provisions concerning the use of water, including the rights of riparian owners. Moreover, Quebec's Environmental Quality Act, which is concerned primarily with contamination and withdrawals that have a significant effect on the environment, imposes constraints on the use of water.

In the United States. Congress has plenary power under the commerce clause of the U.S. Constitution to regulate interstate commerce. This federal authority includes the power to authorize and control the diversion of water from one navigable waterway to another or from one watershed to another, and it also includes the power to authorize the use of water for navigational purposes. The exercise of this Congressional power is as broad as the needs of commerce. It extends to the use of water of a navigable stream for the production of hydroelectric power and to the protection of navigable waters from obstruction by out-of-basin diversions and from pollution. In the absence of Congressional approval, states are not permitted to take actions that interfere with interstate commerce.

The Great Lakes Basin Compact, which was agreed to by the eight Great Lakes states and approved by the U.S. Congress in 1968 and which created the Great Lakes Commission, provides, among other things, for joint or cooperative action to promote the orderly, integrated, and comprehensive development, use, and conservation of the water resources of the Great Lakes Basin and to plan for the welfare and development of these water resources.

The Water Resources Development Act of 1986 (WRDA) is a federal law that prohibits any further diversion of water from any U.S. portion of the Great Lakes or their tributaries for use outside the Basin unless such diversion is approved by all Great Lakes governors. It also prohibits federal studies of diversions without the concurrence of the governors.

The impetus for the Charter and for WRDA was the concern in the U.S. portion of the Great Lakes Basin, in the early 1980s, that there would be major demands for Great Lakes Basin water from the agricultural and energy sectors of the United States west and south.

Historically, surface water law in each of the Great Lakes states has been based on the doctrine of riparian rights. Under this doctrine, the right to make reasonable use of water in rivers and lakes was incidental to the ownership of land that abutted the water. Leaving aside the relevant provisions of the Boundary Waters Treaty, this right could be exercised even if it caused some diminution in the quantity or quality of the water remaining in the river or lake. The riparian right was usually limited to the use of the water on the riparian land and within the watershed of origin. Traditionally, the use of groundwater was not similarly restricted. Each of the Great Lakes states has made legislative changes to the legal regime over many years.

With the signing of the Great Lakes Charter, each of the Great Lakes states found it necessary to institute a legal regime for protecting the Great Lakes ecosystem. Different states have adopted different statutes. Most state laws deal with water withdrawals in general or with withdrawals in the context of Basin waters. Typically, the level of withdrawal that triggers state-permitting requirements is well below that which triggers review under the Great Lakes Charter. While some Basin states (Minnesota, New York, and Wisconsin) include a statutory provision that specifically requires consultations with the other Great Lakes states and provinces in the event of diversions from the Basin that fall within the

Charter's trigger provision of 5 million gallons (19 million liters) per day, others have not provided for this explicitly.

Since the signing of the Great Lakes Charter, and the adoption of the Water Resources Development Act, several proposals for diversions of Great Lakes water have been considered by the Great Lakes governors and premiers. These proposals include diversions at Pleasant Prairie, Wisconsin, and Akron, Ohio, which were approved, and Lowell, Indiana, which was denied. A proposal to divert water from the Crandon Mine to the Wisconsin River was retracted without formal consideration by the Great Lakes governors. A proposal to withdraw water from Lake Huron for the Mud Creek irrigation district in Michigan, an increased consumptive use, went forward even though there were objections by some Great Lakes jurisdictions.

The implementing resolutions for the Great Lakes Charter that were approved by the Great Lakes governors and premiers in 1987 outlined a review process for diversion proposals. A process has evolved for reviewing and approving diversions pursuant to the Charter and the WRDA. A custom and usage has developed of requiring extensive information before a diversion proposal can be approved. The states have also developed the practice of employing the Charter procedures regarding consultation for diversion proposals covered by WRDA that do not meet the Charter trigger point, so that the provinces are consulted although they have no rights under WRDA.

The Commission notes that while WRDA offers the strength of mandatory review of all proposed diversions, concern has been expressed by observers that WRDA applies only to

diversions in the United States, does not address consumptive use, contains no criteria for the governors to use in considering proposals, contains no appeal procedure, and may not cover groundwater.

Aboriginal Peoples and Indian Tribes

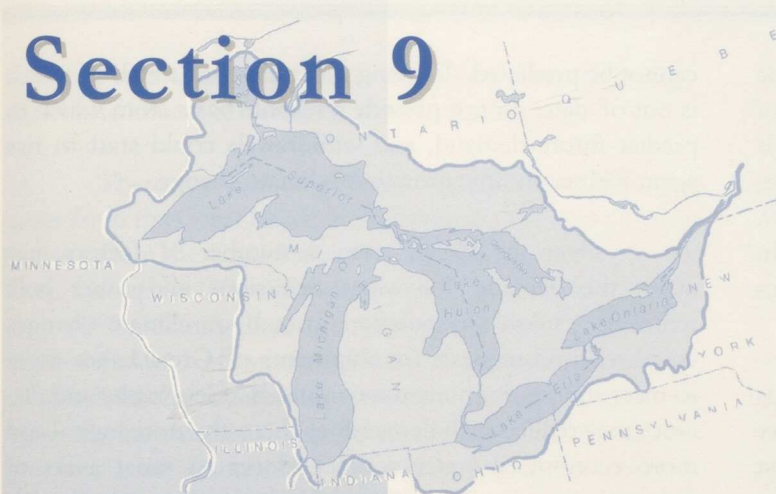
In Canada, Aboriginal and treaty rights are recognized and affirmed by the Constitution Act, 1982, although the specific nature and the extent of these rights have not yet been determined. Aboriginal peoples' interests in land are understood to be communal in nature, involving rights of occupation as well as the use and benefit of resources. The extent to which Aboriginal peoples' interests extend to water and waterways may vary significantly with the circumstances, including whether the particular interest has the status of a treaty right. It is not clearly settled whether Aboriginal peoples' interests in water are riparian in nature. More generally, however, the federal government may have an obligation to consult with Aboriginal peoples, which is underpinned by its fiduciary duty toward them.

In the United States, the right of Indian tribes to the use of the waters of the Great Lakes Basin has continued without significant challenge since the reservations were established (late 1700s to the mid-1800s). Although litigation has occurred regarding the existence and extent of tribal fishing rights in the Great Lakes, there does not appear to have been any dispute over tribal use of water from the Great Lakes or its tributaries flowing through or adjacent to the reservations.

The Commission will continue to examine this subject.

Section 9

Conclusions



The Commission was charged to provide interim recommendations to governments concerning the protection of the waters of the Great Lakes. In the course of developing these recommendations, conducting its studies, and consulting with the public, the Commission was able to draw several conclusions and to note matters it believes should be brought to the attention of governments at this time. The Commission was also able to identify and build upon principles that would effectively lead to both the protection and the enhancement of the Great Lakes ecosystem.

The Great Lakes Basin Ecosystem

1. Water is a critical resource that is essential for all forms of life and for a broad range of economic and social activities. The Great Lakes, sometimes referred to as North America's inland sea, are one of the largest freshwater ecosystems in the world and support 33 million people and a diversity of plant and animal populations. Moreover, the lakes are a central feature of the natural and cultural heritage of the region, of Canada and the United States, and of the global community at large.
2. The Great Lakes aquatic ecosystem is made up not only of the lakes themselves, but also of the complex network of tributaries and groundwater on which the lakes depend. Changes to the lakes, the tributaries, or the groundwater can alter the balance of the ecosystem of the region in significant and sometimes unpredictable ways. Measures aimed at protecting and conserving the waters of the Great Lakes must cover the surface water of the lakes, connecting channels, tributaries, and groundwater if they are to be effective.
3. Removals of water from the Great Lakes Basin reduce the resilience of the system and its capacity to cope with future, unpredictable stresses. The water has to be replaced in order to restore the system's lost resilience. It is not possible at this time to identify with any confidence all the adverse consequences of water removals so that these consequences could be mitigated. The precautionary approach dictates that removals should not be authorized unless it can be shown, with confidence, that they will not adversely affect the integrity of the Great Lakes Basin ecosystem.
4. Although the outflows from Lake Ontario and Lake Superior are regulated, the levels of the lakes ultimately depend on climatic conditions that cannot be controlled or

even reliably predicted. It can, however, be expected that the Great Lakes system will continue to experience periods of high and low precipitation and therefore high and low levels and variable flows, which will be beneficial to some interests, and disruptive to others. As illustrated during 1998–99, water levels can change quickly over short periods in response to climate conditions, the level of Lakes Michigan–Huron dropped 57 cm (22 in.) in 12 months.

5. If all interests in the Basin are considered, there is never a "surplus" of water in the Great Lakes system. Every drop of water has several potential uses, and trade-offs must be made when, through human intervention, waters are removed from the system. Environmental interests, for example, require fluctuations between high and low levels to preserve diversity. Seemingly "wasted," the infrequent very high waters do, in fact, serve a purpose by inundating less frequently wetted areas and renewing habitat for their biotic occupants. Major outflows from the Great Lakes provide needed freshwater input to fisheries as far away as the Gulf of Maine.

6. Water quantity and water quality are inextricably linked. For most uses, quantity alone does not satisfy the demand. Although significant strides have been made toward restoring and preserving the quality of water in the Great Lakes Basin, in many areas, poor water quality continues to impair the potential uses of the waters of the Great Lakes.

7. Mounting evidence of the potential for climate change adds to the uncertainty of future supplies to the Great Lakes and how the levels and flows of the lakes will be affected. Most models suggest that global warming would lower Great Lakes levels and outflows. There is information to suggest that there could be more frequent and severe unexpected local weather events. Climate change also has the potential to increase the demand for water, both inside and outside the Great Lakes Basin.

8. There is uncertainty not only with respect to water supplies to the Great Lakes Basin, but also with respect to future demand for water within the Basin. The use of water for irrigation is increasing in the Basin. Currently, however, there is a trend to slower growth in water withdrawals in the Great Lakes region. This trend is the result of conservation and environmental measures, shifts in resources from the industrial sector to the service sector, and a decline in population growth, mainly in the portion of the Basin that lies within the United States. Whether this trend will continue

cannot be predicted. Existing water use data, much of which is out of date, do not provide a reliable basis from which to predict future demand, and withdrawals could start to rise again with economic growth or climate change.

9. Over the longer term, a number of factors may affect the demand for water diversions and other bulk removals. Global population growth or climate changes could result in requests for shipments of Great Lakes water to meet short-term humanitarian needs. Geography and distance may reduce such demands as there are more logical and more economical water sources closer to most areas of potential drought. The United Nations advocates that the solution to future water crises rests with nations learning to use water more efficiently, not in shipping freshwater around the world.

10. Although there is uncertainty and a lack of adequate information about withdrawals of groundwater, it is estimated that about 5 percent of all withdrawals in the Basin are from groundwater. Consumption of groundwater does not currently appear to be a major factor with respect to Great Lakes levels. It is, nevertheless, a matter of considerable concern and importance to the significant portion of the Basin's population who rely on groundwater.

11. There do not appear to be any active proposals for major diversion projects either into or out of the Basin at the present time. There is little reason to believe that such projects will become economically, environmentally, and socially feasible in the foreseeable future. There are no active proposals for any smaller diversions into or out of the Great Lakes Basin at this time.

12. Apart from the many engineering, economic, environmental, and social obstacles to construction of large-scale diversions, and given the variations in water levels and flows in the Great Lakes, it would be impossible for the Great Lakes jurisdictions to guarantee an uninterrupted supply to any mega-removal. Some interests in the Great Lakes Basin, such as riparian homeowners, might welcome a means of removing water from the Basin during periods of extremely high levels. Most interests, including in-stream interests, commercial navigation, and recreational boating, would be adamantly opposed to such removals in periods of low levels.

13. Diversions during droughts would be difficult to interrupt because of the dependency that diversions create among recipients. The Commission recognizes that once a

diversion to a water-poor area is permitted, it would be very difficult to shut it off at some time in the future.

14. There are not, at present, significant removals of water from the Great Lakes Basin by truck. There is no trade in water from the Great Lakes by marine tanker, although the Nova Group in 1998 did seek a permit to ship 600 million liters (159 million gallons) of water from Lake Superior to Asia annually. Moreover, despite the increase that has occurred in the market for bottled water, the volume of water leaving the Great Lakes Basin in bottles is not significant, nor is the amount of ballast water leaving the Basin

Great Lakes Basin Laws and Policies

15. The Great Lakes Basin extends across the boundary between Canada and the United States and the borders of eight states and of the provinces of Ontario and Quebec. None of these governments alone can regulate water in the entire Basin. The Great Lakes are an integrated hydrologic system. When water is removed from the Basin on one side of the international boundary by either consumptive use or removals, the amount of water that is available on both sides is reduced. Measures to protect and conserve the waters of the Great Lakes ecosystem must therefore be directed at the Basin as a whole in order to be effective. This requires cooperation and coordination among the governments with responsibilities in the Basin.

16. At the international level, the waters of the Great Lakes are subject to the requirements of the Boundary Waters Treaty, which has established a binational regime that has been in place since 1909. The treaty requires, among other things, a special agreement between the governments of Canada and the United States or approval of the International Joint Commission for uses of boundary waters that affect levels or flows on the other side of the border. It also provides that each country reserves exclusive jurisdiction and control over tributaries of boundary waters.

17. The Boundary Waters Treaty, after 90 years, continues to provide effective protection for both countries from abuses to the waters of the Great Lakes Basin ecosystem. It represents a proven regime for avoiding and resolving disputes that arise between Canada and the United States over boundary waters and transboundary rivers.

18. The Great Lakes Charter is an effective arrangement among the Great Lakes states and the provinces of Ontario and Quebec. Although it is not legally binding, the Charter fosters cooperation among the states and provinces on water resource issues and requires that the states and provinces notify each other of major new or increased diversions or consumptive use.

19. The Charter's trigger amount for consideration of significant proposed new diversions and consumptive use is too high. The Charter does not require the consent of all Great Lakes states and provinces before allowing a new diversion or consumptive use to proceed, it does not establish criteria for when such consent should be given or withheld, and it does not provide for public involvement during the consultation process.

20. There are now laws in both countries that, in different ways, limit removals of water from the Great Lakes Basin. These laws, however, apply only in the jurisdictions that enacted them; they can be changed by those jurisdictions at any time and do not constitute a binational regime.

21. While the Commission intends to conduct further research on trade issues during the second phase of this study, its preliminary conclusion is that international trade law obligations—including the provisions of the Canada–United States Free Trade Agreement, the North American Free Trade Agreement, and World Trade Organization agreements, including the General Agreement on Tariffs and Trade (GATT)—do not prevent Canada and the United States from taking measures to protect their water resources and preserve the integrity of the Great Lakes Basin ecosystem so long as there is no discrimination by decision makers against individuals from other countries in the application of those measures. Canada and the United States cannot be compelled by trade laws to endanger the waters of the Great Lakes ecosystem.

Principles

22. To ensure the protection and conservation of the waters of the Great Lakes, the Commission concludes that the following principles should guide their management:

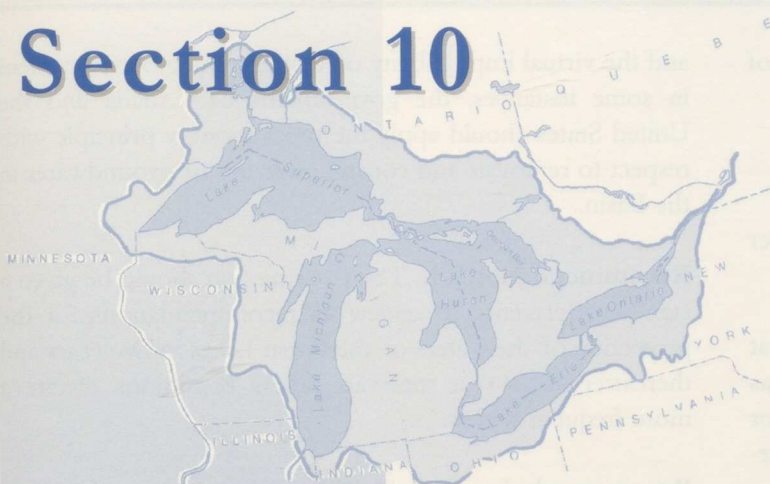
- **Integrity of the Ecosystem:** The Great Lakes Basin is an integrated and fragile ecosystem. Its surface and

groundwater resources are part of a single hydrologic system and should be dealt with as a unified whole in ways that take into account water quantity, water quality, and ecosystem integrity.

- **The Precautionary Approach:** Because there is uncertainty about the availability of Great Lakes water in the future—in the light of previous variations in climatic conditions as well as potential climate change, uncertainty about the demands that may be placed on that water, uncertainty about the reliability of existing data, and uncertainty about the extent to which removals and consumptive use harm, perhaps irreparably, the integrity of the Basin ecosystem—caution should be used in managing water to protect the resource for the future. There should be a bias in favor of retaining water in the system and using it more efficiently and effectively.
- **Sustainability:** Water and related resources of the Basin should be used and managed to meet present needs, while not foreclosing options for future generations to meet their cultural, economic, environmental, and social needs.
- **Water Conservation:** There should be an obligation to apply the best conservation and demand-management practices to reduce water use and consumptive losses and thus retain water in the Basin.
- **Cooperation:** Decisions regarding management of water resources must involve cooperation among the two federal governments, the Great Lakes states and provinces, the tribes and Aboriginal peoples, the municipalities and regions, and the citizenry on both sides of the boundary. The processes must be open to involvement and meaningful participation by these governments, the stakeholders, and the public.
- **Existing Institutions:** Existing institutions, processes, and legal instruments—including the Boundary Waters Treaty, the International Joint Commission, the Great Lakes Charter, the U.S. Water Resources Development Act, the Ontario Water Taking and Transfer Regulation, and the Great Lakes Commission—have provided vehicles to deal with water use issues. It is important to retain these strengths in any new process. Moreover, it is important to continue to respect existing international agreements and arrangements and the rights of tribes and Aboriginal peoples.
- **Measurable Objectives, Sound Science, and Adaptive Management:** Water resource goals should, whenever possible, be established as measurable objectives that can be assessed through open, objective, scientific studies that are subject to peer review. Where information is incomplete, particularly with respect to emerging issues of concern, decisions should be based on the precautionary approach and should take into account the best available data, information, and knowledge, including cultural, economic, environmental, and social values.
- **Fairness:** The Great Lakes Basin community is broad, diverse, and interdependent. Culturally and economically, it extends beyond the physical confines of the hydrologic basin. It is important that programs designed to protect the ecological foundation of the Basin community be, and be seen to be, fair to all those who use and contribute to the Basin and are part of the community.

Section 10

Recommendations



Based on the results of its studies to date, the Commission offers to the governments the following interim recommendations:

Recommendation I. Pending submission of its final report under the Reference, the Commission recommends that the federal, state, and provincial governments should not authorize or permit any new bulk sales or removals of surface water or groundwater from the Great Lakes Basin and should continue to exercise caution with regard to consumptive use of these waters, in accordance with existing laws in both countries and with the Great Lakes Charter.

Recommendation II. Over the next 6 months, the Commission will consult with governments and the public concerning the recommendation set out below:

The governments of Canada and the United States, the governments of the Great Lakes states, and the governments of Ontario and Quebec should notify each other of any proposals for the removal of water from the Great Lakes Basin.

Consultations regarding proposed removals should continue in accordance with the procedures and processes that are evolving throughout the Great Lakes Basin and should be coupled with additional opportunities for public involvement.

Without prejudice to the authority of the federal governments of the United States and Canada, the governments of the Great Lakes states and Ontario and Quebec should not permit any proposal for removal of water from the Great Lakes Basin to proceed if the removal would endanger the integrity of the ecosystem of the Great Lakes Basin.

Based upon available information, the following classes of removals should be considered, at this time, *prima facie*, not to endanger the integrity of the ecosystem of the Great Lakes Basin:

- Water that is removed and then returned to the Basin, if (1) there are no practical alternatives to the removal, and (2) using the best available technology and the most appropriate conservation measures, there is no net loss to the area from which it is taken, and, in any event, no greater than a 5 percent loss, which represents the average loss of all consumptive uses in the Great Lakes Basin, and (3) the water is returned in a condition that, using the best available technology, protects

the water quality of, and prevents the introduction of invasive alien species into, the Great Lakes.

- Water that is used for ballast for vessels.
- Water that is in containers of 20 liters or less or water that is used for short-term humanitarian purposes.

Any transboundary disagreements concerning the above that the affected governments are not able to resolve may, as appropriate, be referred by the governments of Canada or the United States to the International Joint Commission pursuant to Article IX of the Boundary Waters Treaty.

Nothing in this recommendation alters rights or obligations under the Boundary Waters Treaty.

Recommendation III. Governments should immediately take steps to ensure that, on a binational basis, (1) improved monitoring is undertaken of Great Lakes supplies and water uses, and that (2) research is coordinated on their individual and cumulative impacts on the integrity of the Great Lakes basin ecosystem. Moreover, governments should, on a binational basis, emphasize and support development and maintenance of a common base of data and information regarding the use and management of the water resources of the Great Lakes Basin, establish systematic arrangements for the exchange of water data and information, and undertake coordinated research efforts to provide improved information for future water planning and management decisions.

Recommendation IV. Governments should immediately take steps to enhance groundwater research in order to better understand the role of groundwater in the Great Lakes Basin and, in particular, to better understand the issues set out in Section 6 of this report.

Recommendation V. In recognition of the frequent and pervasive interaction between groundwater and surface water

and the virtual impossibility of distinguishing between them in some instances, the governments of Canada and the United States should apply the precautionary principle with respect to removals and consumptive use of groundwater in the Basin.

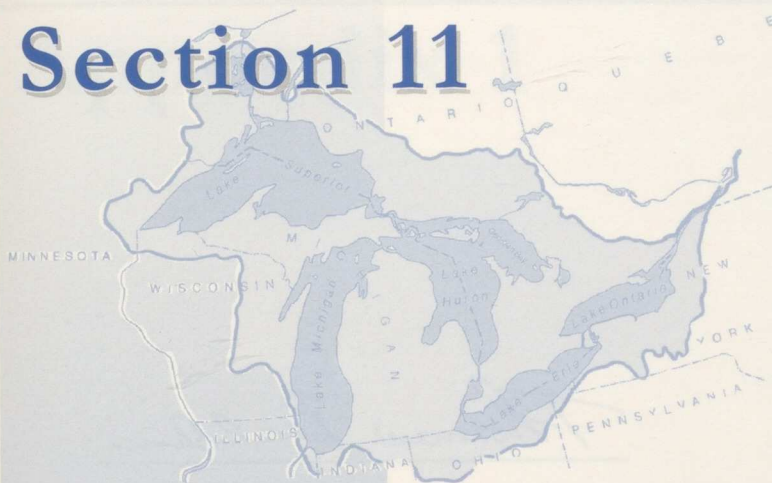
Recommendation VI. The Commission should be given a standing Reference to review its recommendations for the protection of the waters of the Great Lakes in five years and thereafter at 10-year intervals unless conditions dictate a more frequent review.

Recommendation VII. To help ensure the continued sustainable use of the water resources of the Great Lakes Basin, federal, state, provincial, and municipal governments should begin immediately to develop and implement enhanced water conservation and water demand-management strategies to minimize consumptive losses of water from the Basin.

Recommendation VIII. To help ensure the effective, cooperative, and timely implementation of programs for the sustainable use of the water resources of the Great Lakes Basin, governments should use and build on existing institutions to implement the recommendations of this report. In this regard, the governments of the states and the provinces should take action, with respect to the implementation of the Great Lakes Charter, to:

- develop and implement, on an urgent basis, the Basin Water Resources Management Program,
- lower substantially the trigger point for proposed new or increased consumptive use that require notice, consultation, and the seeking of consent and concurrence,
- ensure that the notice and consultation process under the Charter is open and transparent and that there is adequate consultation with the public.

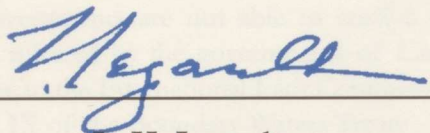
Section 11



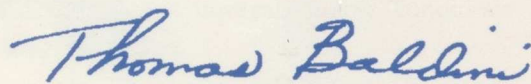
Next Steps

The Commission has been asked in the Reference to submit its final report on the Great Lakes by February 10, 2000. Within the next six months, the Commission will complete its further work on the Great Lakes and will, as the governments requested, prepare views on additional work that may be required to better understand the implications of consumption, diversion, and removal of water from other boundary waters, waters of transboundary basins, and groundwater of shared aquifers. The Commission will be giving special attention to the following:

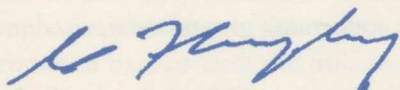
- obtaining more recent water consumption data,
- developing additional information concerning groundwater,
- determining cumulative impacts of changes in Great Lakes levels that could be or are occasioned by current and future removals and consumptive use,
- further examining trade law,
- continuing consultation with state and provincial officials and the public concerning the Commission's recommendations and other approaches to the management of removals and consumptive use.



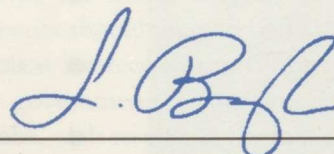
L. H. Legault
Canadian Chairman



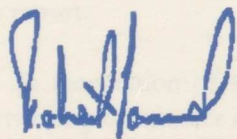
Thomas L. Baldini
United States Chairman



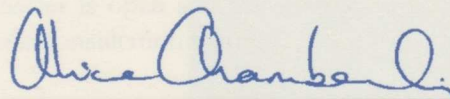
Francis Murphy
Commissioner



Susan B. Bayh
Commissioner



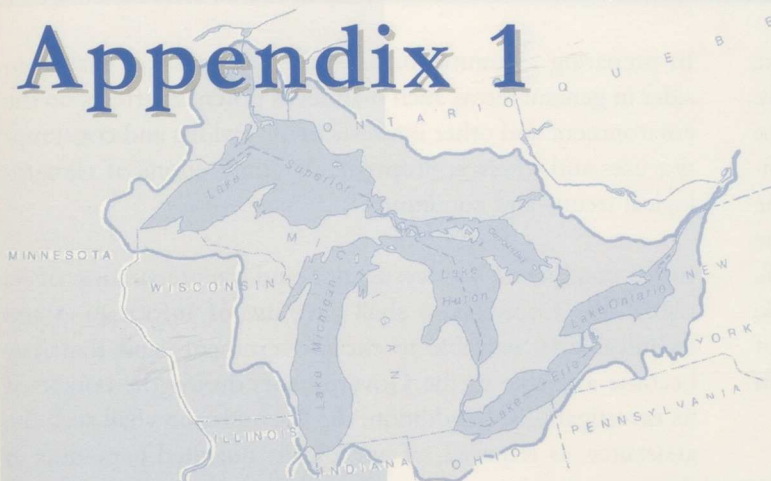
Robert Gourd
Commissioner



Alice Chamberlin
Commissioner

Appendix 1

Letter of Reference



I have the honor to inform you the Governments of the United States and Canada have agreed, pursuant to Article IX of the Boundary Waters Treaty of 1909, to request the Commission to examine into and report upon matters concerning the use of waters along our common border.

Recently, a proposal to export water by tanker from Lake Superior arose. The Governments are concerned that individual projects of apparently minor effect will set a precedent of bulk removal of water from the Great Lakes basin, opening the Great Lakes and other water bodies to subsequent water removal initiatives, with unpredictable consequences. The bulk removal of water raises serious concern over cumulative impacts on lakes, rivers and other water sources.

Boundary water resources continue to be the subject of ever-increasing demands in the light of expanding populations. Proposals to use, divert and remove greater amounts of such waters can be expected.

The Governments are concerned that current management principles and conservation measures may be inadequate to ensure the future sustainable use of our shared waters.

The Commission is requested to examine, report upon, and provide recommendations as the Commission deems appropriate on the following matters which have, or may have, effects on levels and flows of waters within the boundary or transboundary basins and shared aquifers:

- a) Existing and potential consumptive uses of water;
- b) Existing and potential diversions of water in and out of the transboundary basins, including withdrawals of water for export;
- c) The cumulative effects of existing and potential diversions, and removals of water, including removals in bulk for export;
- d) The current laws and policies as may affect the sustainability of the water resources in boundary and transboundary basins.

The Governments note that extensive research has already been conducted about the Great Lakes, in particular, the Commission's January 1985 report "Great Lakes Diversions and Consumptive Uses". The Governments believe that the Commission's

1985 Report with respect to the Great Lakes, including Lake Michigan, provides a good basis on which to begin the study. In the light of this existing body of knowledge pertaining to the Great Lakes, as well as the urgency of this issue precipitated by export proposals, the Governments request that the Commission give first priority to an examination of the Great Lakes basin, focussing on the potential effects of bulk water removal, including removals for export and provide interim recommendations for the protection of the waters of the Great Lakes, as can be developed from available data, in six months from February 10, 1999.

The Governments further request that the Commission subsequently complete other work on the Great Lakes as may be needed. The Commission is asked to submit its final report on the Great Lakes at the latest six months after the interim report.

In its final report on the Great Lakes, the Commission is further requested to report on additional work that may be required to better understand the implications of consumption, diversions and removal of water, including removals for export from other boundary waters, waters of transboundary basins, and groundwater of shared aquifers. In this regard, the Commission is asked to prepare a plan proposing the phasing of such additional work.

In preparing recommendations, the Commission shall consider in general terms such matters as potential effects on the environment and other interests of diversions and consumptive uses and where appropriate, the implications of climatological trends and conditions.

In the conduct of its investigation and the preparation of its report, the Commission shall have use of information and technical data available to the Governments and that may become available to the Governments during the course of its investigations. In addition, the Commission shall seek the assistance, as required, of specifically qualified personnel in the two countries.

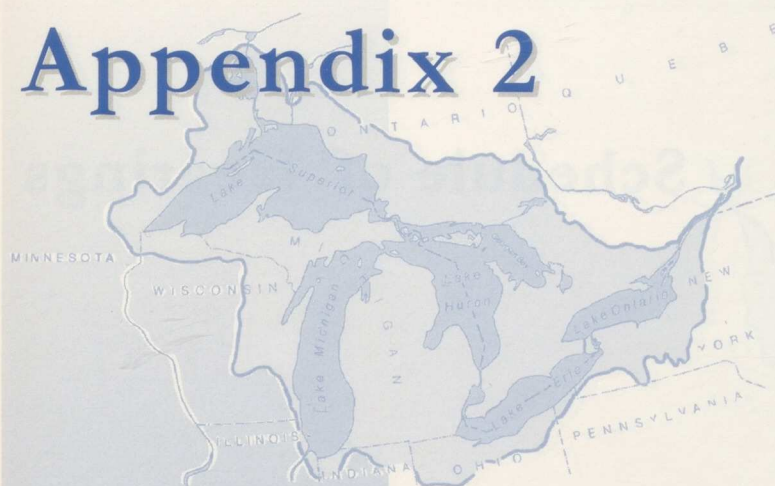
The Governments shall seek in equal shares the funds required to provide the Commission with the resources needed to discharge the obligations under the reference. The Commission shall develop, as early as practicable, cost projecting for the studies under reference, for the information of the Governments.

An identical letter is being sent to the Secretary of the Canadian Section of the Commission by the Department of Foreign Affairs and International Trade.

An identical letter is being sent to the Secretary of the US Section of the Commission by State Department.

Appendix 2

Study Team



CANADIAN MEMBERS

Mr. Ralph Pentland
Co-Director, Canada
Consultant

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Water Issues Division
Environment Canada

Mr. J. Owen Saunders
Executive Director
Canadian Institute of Resources Law
The University of Calgary

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Environnement et développement
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Ms. Paula Thompson
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Ministry of Natural Resources, Ontario

Mr. Anthony Clarke
Senior Environment Adviser
IJC Liaison

Dr. Frank J. Quinn
Special Adviser
IJC Liaison

U.S. MEMBERS

Colonel James Houghton
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U.S. Army Corps of Engineers

Mr. Gary N. Paulachok
Water Resources Division
U.S. Geological Survey

(Alternate: Mr. William G. Shope)

Dr. Michael J. Donahue
Executive Director
Great Lakes Commission

Ms. Shannon E. Cunniff
Bureau of Reclamation
Department of Interior

Ms. Margaret Grant
Executive Director
Council of Great Lakes Governors

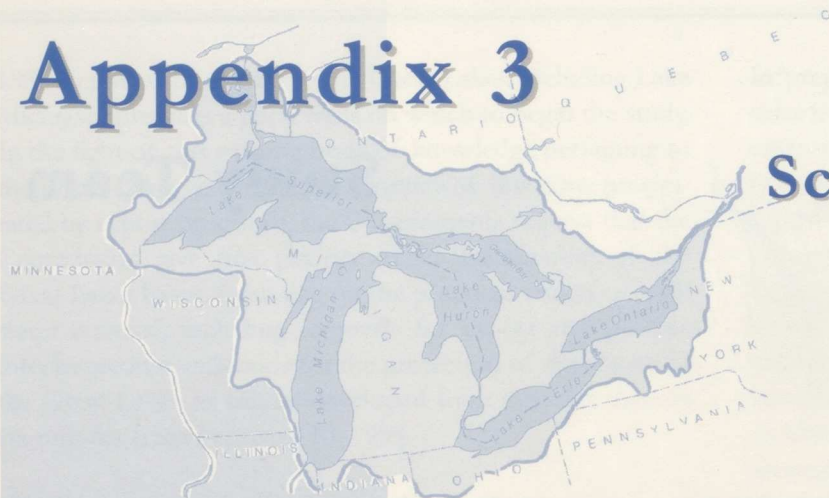
(Alternate: Mr. Jeffrey Edstrom)

Mr. James Chandler
Legal Adviser
IJC Liaison

Mr. Bruce Bandurski
Ecomanagement Adviser
IJC Liaison

Appendix 3

Schedule of Hearings



Cleveland, March 17, 1999

Wyndham Cleveland Hotel
1260 Euclid Avenue
Cleveland, Ohio

Montreal, March 17, 1999

Marriott Château Champlain
1 Place du Canada
Montréal, Québec

Chicago, March 18, 1999

Palmer House Hilton
17 East Monroe Street
Chicago, Illinois

Toronto, March 18, 1999

Crowne Plaza Hotel
225 Front Street West
Toronto, Ontario

Sault Ste. Marie, March 22, 1999

Ramada Inn & Convention Centre
229 Great Northern Road
Sault Ste. Marie, Ontario

Windsor, March 23, 1999

The Cleary International Centre
201 Riverside Drive West
Windsor, Ontario

Duluth, March 24, 1999

Radisson Hotel Duluth Harborview
505 West Superior Street
Duluth, Minnesota

Rochester, March 25, 1999

Marriott-Rochester Airport
1890 Ridge Road
Rochester, New York

Appendix 4



Glossary of Terms

Consumptive Use: That portion of water withdrawn which is evaporated, transpired from plants, incorporated into products or otherwise lost, and thus is not available for further use in the basin.

Cubic feet per second (cfs): Unit expressing rate of discharge. One cfs is equivalent to one cubic foot of water flowing past a particular point in one second. The flow over Niagara Falls in daylight hours in the tourist season is 100,000 cfs.

Cubic meters per second (cms): Unit expressing rate of discharge. One cms is equivalent to one cubic meter of water flowing past a particular point in one second. The flow over Niagara Falls in daylight hours in the tourist season is 2830 cms. One cms equals 35.315 cfs.

Diversion: Water conveyed by canal, pipeline, modified channel or any similar means from its basin of origin for use in another drainage basin. This usually means interbasin diversion, e.g., Chicago diversion out of, or Ogoki diversion into, the Great Lakes Basin. There may also be diversions between sub-basins called intrabasin diversions, e.g., Welland Canal, diverting water from Lake Erie to Lake Ontario.

Ecosystem Integrity: Capacity of the ecosystem to maintain operations under normal conditions, to cope with external influences, and to continue the dynamic process of self-organization indefinitely.

Great Lakes Ecosystem: The interacting components of air, land, water and living organisms, including humans, within the Great Lakes Basin.

Net Basin Supply: Net water supply in the Basin resulting from precipitation on the Lakes' surfaces, runoff from their tributary drainage areas, groundwater flow into or out of the Lakes, and evaporation.

Removal: Water conveyed outside its basin of origin by any means. Bulk removal includes diversions or other means such as tanker ships or trucks which carry water in larger volumes, but excludes water used as ballast in ships or incorporated into products or otherwise bottled for retail sale.

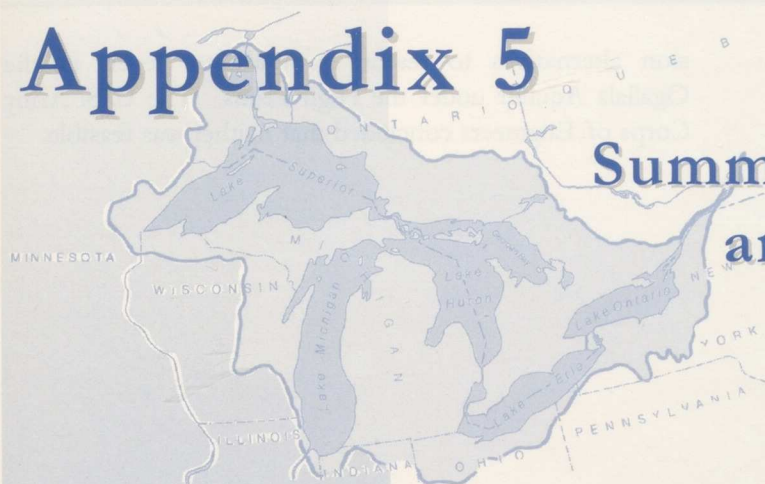
Return Flow (Non-Consumptive Use): The remaining portion of water withdrawn which returns to surface or underground sources after use, and thus becomes available for further use in the Basin.

Sustainable Management: A set of objectives and activities consistent with the purpose of maintaining or improving the integrity of the ecosystem and contributing to the well-being of its living systems, now and in the future.

Withdrawal: Water taken from nature —surface or ground water - for uses such as municipal and industrial.

Appendix 5

Summary of Past Diversion and Removal Proposals



In 1959, private sector interests first proposed the GRAND Canal scheme. This proposal called for a dike to be built across James Bay so that the massive inflows from Ontario and Quebec could be caught and pumped up to the Great Lakes and beyond to drier parts of the continent. The scheme has not overcome criticism of its huge socioeconomic and environmental costs. A number of proposals to draw small quantities of water for coal slurry pipelines, mine de-watering operations and small communities beyond the basin have not proceeded.

The prospect of an expanded diversion at Chicago has concerned other jurisdictions around the Great Lakes for many years. Like other navigable links which preceded the Boundary Waters Treaty of 1909, historic rates of diversion at Chicago were accepted but any expansion beyond the U.S. Supreme Court decreed limit of 3,200 cfs has been resisted. The most recent discussion of increases in the amount of the diversion was initiated, in 1988, by southern Congressmen and the U.S. Army Corps of Engineers. The Corps was asked to consider increasing the diversion to 10,000 cfs as a short-term (1-2 month) emergency means of maintaining barge navigation downstream on the Mississippi during a summer drought. This proposal was shelved after review indicated that the additional flows would have only marginal impact on Mississippi River conditions and that any increased diversions would face strong opposition from Great Lakes jurisdictions.

Various other smaller-scale proposals to divert water from the Great Lakes Basin have been abandoned, in recent years, as a result of increasing opposition by Great Lakes jurisdictions which have worked to create institutions and legislation to regulate this kind of activity.

In Canada, a federal-provincial investigation was started in 1965 into the engineering costs of importing more water from northern Ontario to increase hydroelectric power generation in the Great Lakes Basin. The investigation was terminated in 1974 without reaching a conclusion. At about the same time, the Ontario Water Resources Commission studied taking water to inland communities within the Great Lakes Basin, such as Kitchener-Waterloo and other municipalities in the vicinity of Toronto, through pipelines from Lake Huron, Lake Erie and Lake Ontario. Private and municipal interests have undertaken similar investigations in the present decade but, to date, it has not been shown that local alternatives, including conservation practices, do not provide adequate means for these communities to meet their water needs.

In the early 1970s, the U.S. Army Corps of Engineers completed a review of possible diversions from the Great Lakes to ease the effects of drought in the northeastern states. Twelve years later, in 1982, the Corps report reviewed diver-

sion alternatives to restore groundwater levels in the Ogallala Aquifer under the High Plains. The U. S. Army Corps of Engineers concluded that neither was feasible.

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P. O. Box 32869
Detroit, Michigan
48232-2869

August 1999

This report may be obtained from the Commission's Web Site at www.ijc.org

Ce rapport est également disponible en français



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The Great Lakes are a system in balance; climate change, significant diversion, bulk water exports or great increases in consumptive uses all could cause significant reduction in inflow of water over the long term. ... Diversions may be individually innocuous, but are cumulatively dangerous. *Elaine Marsh, Great Lakes United* ● Groundwater diversions require the same safeguards as surface water diversions ... Obviously groundwater is connected to surface water. *Albert Ettinger, Environmental Law and Policy Center* ● If anybody owns the water in Lake Superior, we do and our water is not for sale. Our lake is not for exploitation, rather to honor, respect and protect as anyone treats something they consider sacred. *Judy Pratt-Shelley, Red Cliff Band of Lake Superior Chippewas* ● Water is an integral part of our lives and our ecosystem. We can't just think of it as a commodity that a corporation can sell somewhere else for a profit; it is critical to life. *David Beach, Ecocity Cleveland* ● It's important to not think of this as just a water reference, but to think of it as an ecosystem kind of reference, of which water is very important. *Andrew Hamilton, Commission for Environmental Cooperation* ● There is not an excess of water in one place and scarcity in another. Water is in the place where it naturally belongs. People must learn to live within its limits. *Clara Maurus, League of Women Voters* ● We are not merely the citizens of the Great Lakes; we are their guardians. We must begin to consider the health of Great Lakes in a holistic approach. *Congressman Bart Stupak, Michigan* ● The lakes are not there so private or government corporations can package and sell them for a profit; allowing even one bulk export of water will open Pandora's Box. *Mark Bartlett, Canadian Auto Workers* ● Why is it we want to change the system that has sustained the earth for so long? *Rachelle St. Amour, Sault Ste. Marie* ● Water, water everywhere .. and not a drop for export. *UK Financial Times, London* ● The issue has prompted so much concern that Canada .. joined the United States in asking for a study by the International Joint Commission. *New York Times* ● As with many other things, you start taking a little here, a little there and eventually you find out you are taking a lot of water. *Toronto Star* ● No matter what view you take, you cannot afford to be cavalier about the issue of bulk water sales and other diversions from the Great Lakes watershed. *Detroit Free Press* ● Great Lakes in dire straits: It's our water *Ottawa Citizen* ● Consider the economic importance of the Great Lakes. *Lee Botts, Lake Michigan Federation.* ● Canada has lots and lots of water. Other places, like parts of the United States, have less. Some of those places would like to buy our water. Why shouldn't they? *Globe and Mail, Toronto* ●